

QMS-PS[®] 410

User's Guide



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Laser Safety

This printer is certified as a Class 1 laser product under the U.S. Department of Health and Human Services (DHHS) Radiation Performance Standard according to the Radiation Control for Health and Safety Act of 1968. This means that the printer does not produce hazardous laser radiation.

Since radiation emitted inside the printer is completely confined within protective housings and external covers, the laser beam cannot escape from the machine during any phase of user operation.

FCC Compliance

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

1. Reorient or relocate the receiving antenna.
2. Increase the separation between the equipment and receiver.
3. Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
4. Consult the dealer or an experienced radio/TV technician for help.

CAUTION: To prevent electrical shock, do not remove any covers from your printer, except to install a memory upgrade as described in this manual. Any other servicing should be referred to a qualified technician.

NOTE: A shielded cable is required to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules.

Canadian Users QMS-PS 410

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques (de la classe B) prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

Electronics Emissions

Your printer complies with the Electronics Emissions Requirements of the West-German Federal Minister for Postal and Telecommunication Technology regulation:

VFG. 1046/1984

Your printer complies with the Electronics Emissions Requirements of the European Economic Council directive:

82/499/EEC

A shielded cable is required to comply with VFG 1046, 82/499/EEC.

Vfg 1046/1984 Conformity Statement

Hierdurch bescheinigen wir, daß dieses Produkt in Übereinstimmung mit Postordnung 1046/1984 ist und RFI unterdrückt ist. Die Geschäftslage und der Verkauf diese Geräte auszuprobieren, mit der Übereinstimmung und der Regierung zu bestätigen, wurde der Deutschen Bundespost gegeben.

Bescheinigung des Herstellers/Importeurs

Hiermit wird bescheinigt, daß Thermal Transfer Printer model #QMS PS-410 in Übereinstimmung mit den Bestimmungen der Vfg 1046/1984 funktentstört ist. Der Deutschen Bundespost wurde das Inverkehrbringen dieses Gerätes angezeigt und die Berechtigung zur Überprüfung der Serie auf Einhaltung der Bestimmungen eingeräumt.

QMS Inc., Mobile, AL

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The marketing and sale of this equipment was reported to the German Postal Service.

The right to retest this equipment to verify compliance with the regulation was given to the German Postal Service.

Colophon

This manual was written, illustrated, and formatted using WordPerfect and Ventura Publisher. Typeface fonts are Times and Helvetica from Adobe Systems, Inc. and Courier. The manual was printed in camera-ready form on a QMS-PS printer.

Table of Contents

Chapter 1

Introduction

Introduction	1-1
About the Manuals	1-1
About the QMS-PS 410 Printer	1-2
The Resident Typefaces	1-5
Application Software and Your Printer	1-6

Chapter 2

Printer Use

Introduction	2-1
How Software Drives Your Printer	2-1
About Paper	2-2
Paper Handling	2-5
Tray Feed	2-5
Manual Feed	2-10
Adjusting Print Density	2-16
Printing Diagnostics Pages	2-17

Chapter 3

Selecting Printer Languages

Introduction	3-1
How ESP Works	3-1
Selecting Printer Languages	3-4
Exiting Non-PostScript Printer Languages	3-11
Returning All Ports to the ESP Default	3-12
Operating Notes for Emulation Selection	3-13

Chapter 4

Using Optional Accessories

Introduction	4-1
About Optional Accessories	4-1
The Paper Feeder Tray	4-2
Installing a Feeder Tray	4-3
Putting Paper into the Optional Cassettes.	4-7
Installing a Legal Cassette	4-12
Configuring for Multiple Cassettes.	4-14
Optional Cards	4-15
Memory Upgrades.	4-16

Chapter 5

Professional Printing

Introduction	5-1
The Resident Typeface Families.	5-2
About Typeface and Fonts	5-4
Page Design.	5-12
A Typeface Sampler	5-13

Chapter 6

Printer Care

Introduction	6-1
When to Replace the EP-L Cartridge	6-1
Removing the EP-L Cartridge	6-2
Installing the New EP-L Cartridge	6-5
The Cleaning Sheet	6-7
Breaking in a New EP-L Cartridge.	6-8
Handling the Printer	6-9
Keeping the Printer Clean.	6-10

Chapter 7

Troubleshooting Printer Problems

Introduction	7-1
Active Light	7-3
Power Light	7-4
Printer Error	7-4
Preventing Jams	7-5
Clearing a Paper Jam	7-6
Printer Resets	7-14
Blank Pages	7-14
Not All Pages Are Printed	7-15
Unclear Printout	7-15
Printer Ejects Blank Pages	7-15
Paper Jam Indicator Stays On	7-17
General Print Quality Problems	7-17
Specific Print Quality Problems	7-18
Placing a Service Call	7-21

Chapter 8

Printer/Host Communication

Introduction	8-1
About Serial Communication	8-1
Changing the Default Parameters	8-6
Testing Communication: Sample Files	8-9
Sample PostScript File	8-12
The Error Handler	8-13

Chapter 9

PostScript: Technical Overview

Introduction	9-1
How Your Printer Works	9-1
Using PostScript: Interactive Mode	9-3
Changing the Default Paper Cassette	9-6
The PostScript manualfeed Operator	9-8

	About Timeouts	9-11
	Auto Select and Emulation Timeouts	9-12
	Manual Feed Notes	9-12
Chapter 10	PostScript: Operator Dictionary	
	Introduction	10-1
	About the statusdict	10-2
Chapter 11	HP LaserJet series II Emulation	
	Introduction	11-1
	About HP Emulation	11-1
	Default Settings	11-3
	About PCL Commands	11-4
	LaserJet Command Summary	11-6
	Additional Technical Information	11-13
	Font Selection	11-13
	Paper Size Interactions	11-13
	Storage of Information	11-14
Appendix A	Cable Pinouts	
	IBM PC	A-1
	IBM PC DTR	A-2
	LocalTalk	A-3
	Centronics Parallel	A-4
Appendix B	Technical Specifications	
	Print Engine	B-1
	Controller	B-2
	Paper Handling	B-3

	Interfaces	B-5
	Physical Characteristics	B-6
	Electrical	B-6
	Environmental Requirements	B-6
	Environments	B-7

Appendix C

Optional Accessories Available

QMS Accessories	C-1
---------------------------	-----

Appendix D

Character Encoding Tables

Character Encoding Tables	D-1
-------------------------------------	-----

Appendix E

Computer Literacy

How Your Computer Talks to Your Printer	E-1
Bibliography	E-2

Appendix F

Product Sales and Support

Product Support.	F-1
--------------------------	-----

Glossary

Index

Chapter 1

Introduction

Introduction	1-1
About the Manuals	1-1
About the QMS-PS 410 Printer	1-2
The Resident Typefaces	1-5
Application Software and Your Printer	1-6
Software Printer Drivers	1-7
Printer Setup Strings	1-7

Introduction

This chapter briefly describes printer documentation and introduces the features and benefits of the QMS-PS 410 printer, including how your printer works with application software, how it receives and processes data, and how it transforms data into a printed page.

About the Manuals

Three manuals are included with your printer: the *QMS-PS 410 Getting Started Guide*, the *QMS-PS 410 User's Guide* (this manual), and the *QMS-PS 410 PS Executive Series Utilities User's Guide* (which accompanies the utilities software). First you should read the *Getting Started Guide*, and follow its instructions for unpacking the printer, setting it up, and connecting it to a host computer system. Probably you will not need to refer to the *Getting Started Guide* again; after the initial setup, refer to this manual, the printer user's guide, for information about printer features, operation, and maintenance.

Both this manual and the *Getting Started Guide* refer you periodically to a third manual, the *PS Executive Series Utilities User's Guide*. You use the utilities, a menu-driven software program designed specifically for your printer, to configure the printer and access its capabilities. (You may be able to perform some, but not all, of the utilities' functions through your application software.) The PS Executive Series Utilities manual explains how to install and use the program on a Macintosh or a PC.

To find information in the manuals, refer to the index, and use the table of contents at the beginning of each manual and the more detailed table of contents at the beginning of each chapter.

About the QMS-PS 410 Printer

The QMS-PS 410 printer is the most powerful laser printer in its price range. It gives you rapid processing speed, scalable and rotatable fonts, and the ability to merge text and graphics. Your printer fits easily on your desktop. Some of its other outstanding features are

- Adobe PostScript page description language

PostScript is a programming language with extensive graphics capabilities. PostScript describes the appearance of text, geometric shapes, and images to the printer. PostScript can rotate, scale, clip, and orient all graphic objects on all or part of a page.

- Two megabytes of RAM resident which is expandable to three, four, or six megabytes as your needs grow

RAM (Random Access Memory) expansions improve performance of the QMS-PS 410 printer by allowing more room for font downloading (storage in RAM), font caching (allocating the division of font storage space in RAM), and enlarging the printer buffer (allowing your printer to accept larger jobs in order to free up your host computer).

■ Outstanding print quality

The QMS-PS 410 printer produces solid blacks and crisp fonts no matter what point size.

■ RS-232C serial, Centronics parallel, and LocalTalk (AppleTalk) interfaces which are simultaneously active

This gives you the capability of having more than one system hooked up to the printer at the same time. You can share the printer between two PC's and a Macintosh, or between two PC's with one communicating through a serial cable and one communicating parallel. This sharing may be done with no special networking software or switch boxes. In effect, it transforms your one printer into three printers.

■ ESP (Emulation Sensing Processor)

Using a form of artificial intelligence, ESP technology analyzes incoming file data from any of the printer's interfaces. ESP technology, which works with most popular commercially-available applications, selects the appropriate printer language from those installed on the printer and processes the print job, freeing the user from the need to change printer switch settings or send software commands to accommodate different printer languages.

■ Optional font and emulation cards

Optional, credit-card sized font and emulation cards allow you to customize your printer for your individual needs. Font and emulation cards are listed in the "Optional Accessories" appendix. Additional cards may have become available since this printing. Contact your QMS vendor for further information.

■ Optional paper and envelope cassettes

Also available for the QMS-PS 410 printer is a lower paper tray which changes your printer to a dual tray printer. With cassettes available in popular paper sizes, it expands paper capacity to 320 sheets. Envelope size cassettes are also available. Available cassettes are listed in the “Optional Accessories” appendix.

■ 45 resident typefaces

The QMS-PS 410 printer includes 45 typefaces from 13 typeface families.

■ ASAP III (Advanced System Architecture for Printers III)

The QMS-PS 410 printer introduces the third version of Advanced System Architecture for Printers. This provides faster processing speeds and higher performance for the printer.

Your printer prints documents up to 8-1/2" X 14" (215 mm x 355 mm) incorporating text, line art, half-tones, textures, gray scales, and scanned images in any shape, size, or orientation. These images may be arranged and combined in almost any way imaginable, processed rapidly, then printed at four pages per minute with a resolution of 90,000 dots per square inch.

Your printer is flexible. It can be connected to any Apple Macintosh or IBM PC/compatible. It also works in many mainframe and mini-computer environments via industry-standard RS-232C, Centronics, and LocalTalk (AppleTalk) interfaces. All of its interfaces are active and may be utilized simultaneously.

This combination of features gives you speed, flexibility, and power. A 16 MHz, 68020 microprocessor with ASAP III architecture boosts processing speed, and still produces outstanding print quality. You have PostScript for all your desktop publishing needs and HP PCL emulation for programs that are not PostScript compatible. You can also print color PostScript files in black, white, and shades of gray. This allows you to pre-proof color files quickly and economically before producing a three- or four-color file on a color PostScript printer. Additionally, the two megabytes of standard RAM are expandable to three, four, or six megabytes. A memory expansion lets you send large, data-intensive files (such as graphics files) without tying up the host computer for long periods of time. It also increases space for downloadable typefaces.

The Resident Typefaces

Your printer comes with 45 typefaces resident in memory. The fonts in these typefaces can be rotated, scaled to any size, and filled, depending on your software.

Resident Typeface Families

Helvetica
 Helvetica Narrow
Helvetica Condensed
 ITC Avant Garde
 Times-Roman
Courier
 Palatino
 New Century Schoolbook
 Adobe Garamond
ITC Bookman
ITC Zapf Chancery Medium Italic
 Symbol Set Σψμβολ Σετ
 ITC Zapf Dingbats ❀❀❀❀❀❀❀❀

Also resident in the printer, when in the HP PCL mode, are HP's standard internal typefaces: Courier and Line Printer. You may also download to the printer any of HP's soft fonts.

Application Software and Your Printer

Most people use a software application package to print. The term "software application package" refers to a word processing program, a programming language, or a special application package that handles graphics and prints documents, spreadsheets, and/or forms.

The way your software application package works with your printer is one of the most important aspects of learning how to fully use your printer. Many "printer" problems are in fact related to how your software application package and your printer interact. The QMS-PS 410 printer is unique because it has ESP; it can read most files and determine the printer language if that language is supported by the printer. Once you establish communication with your printer and are in the default ESP mode, you are able to print files from most popular software application packages like WordPerfect, Lotus 1-2-3, Ventura Publisher, Adobe Illustrator, or Microsoft Word. These application programs may use a printer driver for a PostScript printer or the HP LaserJet series II printer. And, you don't have to do anything to the files, the printer, or the application program.

Software applications set the page orientation, margin widths, the number of text lines-per-inch, number of copies, and other printer features. Most software applications use one or both of the following ways to control these features:

- Software printer drivers

■ Printer setup strings

Software Printer Drivers

Some software applications send printer commands by using software printer drivers that are included in the software package. If you use this type of application package, you usually do not see printer commands displayed on the screen. The driver sends them automatically. If the QMS-PS 410 printer is in the default ESP mode, it prints your files whether they are prepared for a PostScript printer or a LaserJet series II printer.

Common software application packages that use printer drivers are Microsoft Word, Ventura Publisher, WordPerfect, MultiMate Advantage II, and all Microsoft Windows applications. Your software application package documentation provides more information on selecting printer drivers.

Printer Setup Strings

Some software application packages allow you to enter printer commands as initialization or setup strings. These printer commands are entered at the beginning of a document or in a special menu provided by your package. The software application sends the string to the printer first, before any other data is transmitted.

Some software applications that can use setup strings are Lotus 1-2-3 and Symphony. If your software application package prepares a file with setups, you may print the file using either ESP mode or the LaserJet series II emulation mode (HP PCL).

Chapter 2

Printer Use

Introduction	2-1
How Software Drives Your Printer	2-1
About Paper	2-2
Paper Storage	2-3
Paper Handling	2-5
Tray Feed	2-5
The Standard Tray	2-6
Optional Lower Cassette	2-8
The Face-Up Output Tray	2-9
Manual Feed	2-10
Manually Feeding Paper	2-10
Double-Sided Printing	2-11
Overlay Printing	2-11
Labels, Transparencies, and Envelopes	2-11
Printing on Labels	2-12
Printing on Transparencies	2-12
Printing on Envelopes	2-12
The Optional Envelope Cassette	2-14
Configuring the Envelope Cassette	2-16
Adjusting Print Density	2-16
Printing Diagnostics Pages	2-17

Introduction

This chapter explains how your printer is given instructions by your software application program, basic printer operation with various kinds of paper and print media, loading paper and envelopes, and the paper delivery system of the printer. It also addresses manual feed and tray switching.

Before using this chapter, you should already have installed your QMS-PS 410 printer and the QMS PS Executive Series Utilities and have your printer communicating with the host. See the *QMS-PS 410 Getting Started Guide* and the PS Executive Series Utilities manual for these instructions.

How Software Drives Your Printer

Before your printer can communicate fully with your software application package, you must have the proper printer driver defined in the application program. If you are accustomed to using a PostScript printer, it is not necessary to re-install a driver. However, if you have installed the optional tray in your printer but have not been using a dual-bin PostScript printer driver, you may want to re-install or obtain a dual-bin PostScript driver from your software application program manufacturer. It may also be necessary to obtain a new driver to be able to access the multiple fonts that are resident in the QMS-PS 410 printer.

We recommend using a QMS-PS driver if available. However, if one is not listed, any PostScript driver works, for example, an Apple LaserWriter driver. Some PostScript printer drivers which work with the QMS-PS 410 printer are

- The QMS-PS 410 driver

- The QMS-PS 810 driver
- The QMS-PS 810 *turbo* driver
- The PS Jet/PS Jet+ driver
- The QMS-PS 800/800+ driver
- The QMS-PS 2000 driver
- The QMS-PS 815/815 MR driver
- The QMS-PS 825/825 MR driver
- Any PostScript printer driver

You may use an HP LaserJet Series II driver if you are in the default ESP mode; however, you will not be able to access PostScript fonts.

About Paper

The printer accommodates paper as light as 16 pound or as heavy as 28 pound (60 to 105 g/m²). Conventional copier paper is good for most applications. Copier paper has a smooth surface, controlled electrical properties, heat stability, and cleanliness. This ensures good image transfer without excessive curl.

If you desire, you may also use special paper for special applications. Bond papers, often used for stationery, may be used with your printer. Colored paper may also be used, but not paper with a colored coating applied after the paper is made. The “Technical Specifications” appendix contains additional paper specifications.

The quality of your print job depends in large part on the quality of the paper and envelopes you select. You may achieve increased

blacks and sharper contrast by using special laser printer paper which is available from a variety of paper manufacturers. This paper is thicker, smoother, and whiter than copier paper and gives your page a more professional appearance.

NOTE: Hammermill Paper offers free samples of their laser paper in varying weights. Call toll free 1-800-242-2148.

The QMS-PS 410 standard tray supports the following sizes of paper:

- Letter, 8 1/2" x 11"
- Legal, 8 1/2" x 14"
- A4, 210 mm x 297 mm
- B5, 182 mm x 257 mm
- Executive, 7 1/4" x 10 1/2"

It may also be adjusted for envelopes. Envelope sizes may be a minimum of 3 1/2" x 7" (86 mm x 178 mm) and a maximum of 7 2/5" x 10 1/2" (188 mm x 267 mm).

The printer receives its instructions on which size paper is installed from your software application program. You may purchase alternate size paper trays and an envelope tray from your QMS vendor.

Paper Storage

The manner in which your paper is stored makes a big difference in print quality and printer operation. Improperly stored paper increases the chance of paper jams during printing and can

drastically affect the appearance of your printed pages. Keep paper in good condition by storing it

- In its wrapper
- On a flat surface
- In a closed cabinet
- In a cool dry area

Do not leave paper unwrapped or in a place where it can be damaged by humidity or heat.

Paper Handling

There are two ways of feeding paper through your printer. You may either print automatically from trays or manually feed paper by hand.

Tray Feed

Tray feed automatically pulls paper from either the standard tray, the optional lower tray, or from both by switching automatically when either tray empties of paper. (Instructions on how to install the optional tray are included later in the “Using Optional Accessories” chapter.)

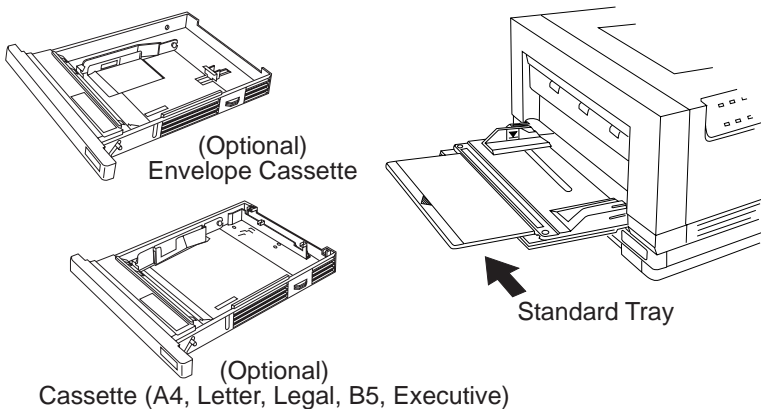


Fig. 2.1 *The QMS-PS 410 Paper Trays*

The Standard Tray

The standard tray (also called the multi-purpose tray) supports several types and sizes of paper and print media and does not require a separate tray for each paper size you use. It may be opened or closed, allowing you to make the printer's size even more compact. This is useful when you are not printing or when you are printing from the optional tray.

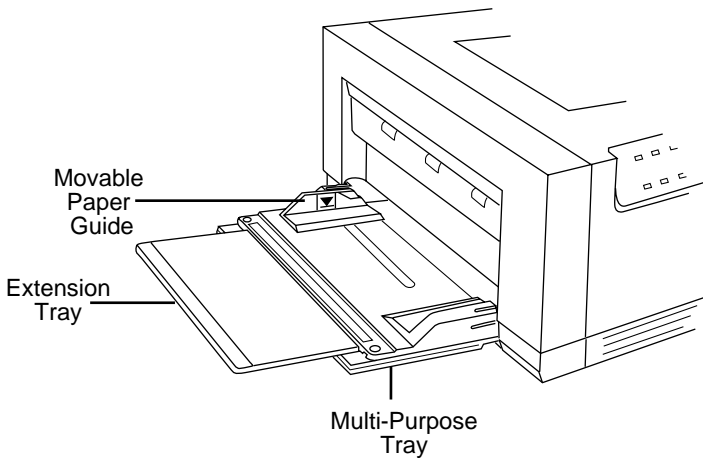


Fig. 2.2 *The Standard Tray*

To print from the standard tray, open the tray door by grasping the handle and pulling down. Grasp the (^) mark in the center of the tray; then pull the extension straight out.

If you are not going to print on an 8 1/2" x 11" size page, adjust the paper guide to the correct mark located toward the edge of the tray. Use the PS Executive Series Utilities software to choose paper trays. See the "Current Paper Source" section of the utilities manual for details.

Tap a stack of no more than 70 sheets of paper to align the edges. Insert the paper into the printer, placing the top left corner of the stack firmly into the printer. Make sure the paper depth is not above the mark on the side of the standard tray.

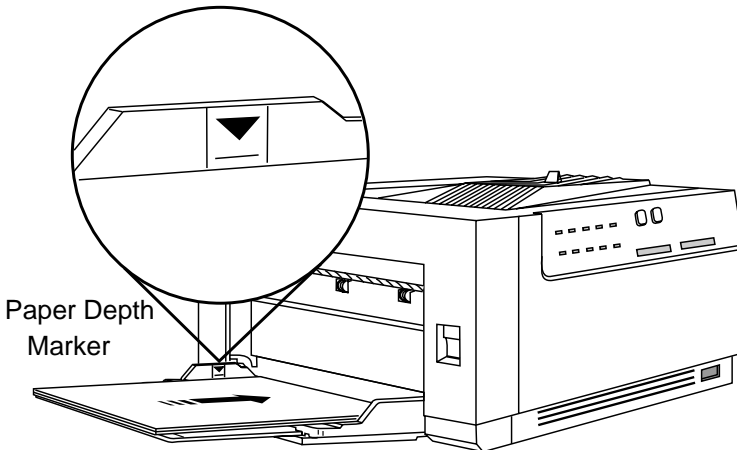


Fig. 2.3 *Set Paper Guide*

Optional Lower Cassette

An optional lower cassette and feeder are available to expand the capacity of your printer to approximately 320 sheets (70 for the standard tray, 250 for the optional). The optional feeder tray is installed under the printer so that the printer rests on top. The lower paper cassette fits into the optional feeder tray. Instructions for installation are included later in the “Optional Accessories” chapter, along with instructions for configuring the trays.

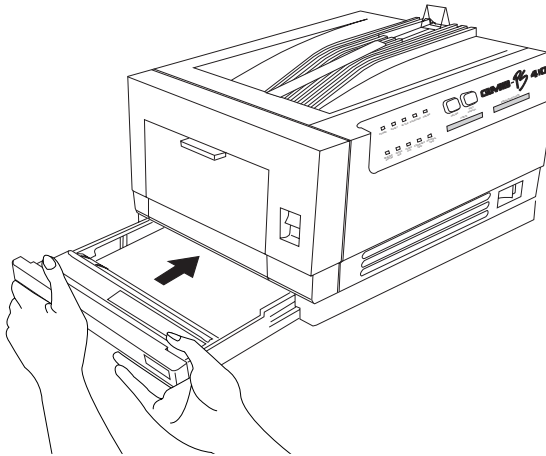


Fig. 2.4 *Printer with Optional Tray Installed*

The Face-Up Output Tray

Paper is normally fed into the delivery tray face-down. This automatically collates your jobs by stacking them in order. However, you may choose to have your jobs delivered face-up. To do so, you must install the face-up output tray.

This tray is recommended for heavy paper stock, envelopes, transparencies, and labels. Using this tray helps to reduce curl. To use the face-up output tray (stacking in reverse order), you must rotate the output selector (circled in fig. 2.5) to the “down” position.

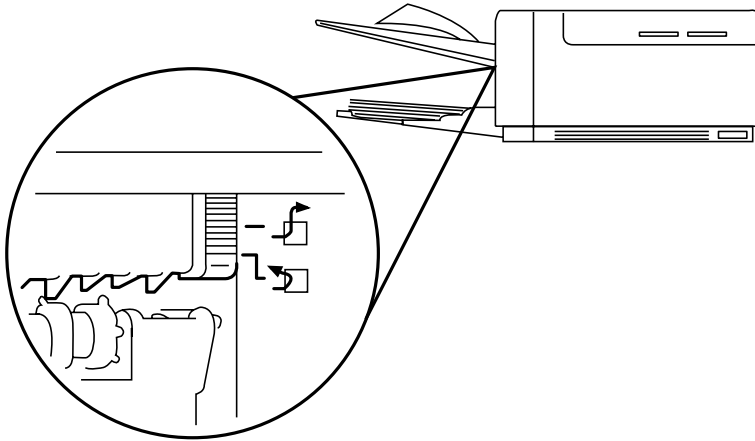


Fig. 2.5 *The Printer's Output Trays*

Attach the face-up output tray to the front of the printer. Flex the tray slightly so the round knobs on the outside edges of the tray slip into the two holes just below the output selector bar.

Manual Feed

Manual feed is the “by hand” method of feeding paper. It is very useful for

- Overlay printing
- Double-sided printing
- Heavy-weight paper and envelope printing

Manual feed makes it possible to feed individual sheets of paper or other material (envelopes and transparency stock) into your printer. Paper weight can range from 16 pound to 28 pound (60 to 105 g/m²).

Manually Feeding Paper

To feed paper by hand from the standard tray

1. Set the paper guides on the standard tray to the size paper you are using.
2. Feed the sheet of paper between the paper guides face up, top edge first.

To feed paper by hand if you have an optional lower tray

1. Select manual feed from either your software application program (this is sometimes called feeder bin) or from the PS Executive Series Utilities program.

If you want to manually feed multiple pages, set your printer for manual feed through the PS Executive Series Utilities program or through the PostScript commands.

Double-Sided Printing

Printing can be done on regular copier-type paper or on pre-printed forms using either manual or cassette feed. Normally, you only print on one side of a page; however, you are not limited to just one-sided printing.

Double-sided printing is possible using manual feed. Print the first side using manual feed.

To print on the back side, simply turn the sheet over and insert it back into the printer. The most frequent problem with double-sided printing is jamming. If you experience this, give the printer and the sheet a short breathing time to cool down before reinserting. Check to see if the paper is curled. If the paper curls after the first pass, uncurl it before inserting it back into the printer.

Overlay Printing

Overlay printing is possible using manual feed. Print one side using one sheet in the standard tray. You may use either regular or manual feed since there is only one sheet of paper in the tray.

To overlay the first printing with a second printing (on the same side), simply insert the paper back into the standard tray image-side down, top edge first, and print the file. This causes the second image to “overlay” on top of the first image.

Labels, Transparencies, and Envelopes

You can print transparencies for overhead projectors, sheets of self-adhesive labels, and envelopes of almost any size using the standard tray. All these special materials require using the face-up collating tray.

Printing on Labels Adhesive label stock has pressure-sensitive (peel and stick) adhesive backing. The procedure for feeding labels is almost the same as for regular paper; however, you must use the face-up output tray and load label-side down to prevent labels from coming loose from the backing sheet. Use only labels recommended for laser printers. Follow the specifications for labels contained in the “Technical Specifications” appendix.

Label data should be formatted within your software application program. Try printing your data on a plain sheet of paper first to check its placement. This reduces the number of label sheets you use.

Printing on Transparencies Use only transparencies recommended for use in laser printers and always use the face-up output tray. The transparency film should be able to withstand temperatures up to 200 degrees Fahrenheit (93 degrees Celsius.)

Transparencies are especially sensitive to a dirty paper path. If shadows are apparent either on the top or the bottom of the sheets, produce a cleaning page to clean the printer’s rollers (see the “Printer Maintenance” chapter).

NOTE: You should remove each transparency from the output tray immediately after printing to prevent jams of subsequent sheets.

Printing on Envelopes Envelopes may be printed from either the standard tray or the optional envelope cassette. If you use the standard tray, feed only one envelope at a time. If you use the envelope cassette, load envelopes as shown in figure 2.7, that is, face down with flap-side of the envelope toward the control panel side of the printer.

Because envelopes pass through heated rollers, the gummed area on the flap may seal. Open the flap immediately after it passes through the printer, before the seal cools. It can then be resealed later in the normal manner. The use of envelopes with emulsion-based glue avoids this problem.

Envelopes of the following size are recommended for both the standard tray and optional cassette:

- Com-10 (4 1/8" x 9 1/2")
- Monarch (3 7/8" x 7 1/2")
- International DL (110 mm x 220 mm)
- C5 (162 mm x 229 mm)

Non-standard envelopes are also accommodated as long as they fall into the following size ranges:

- Width = 3 4/5" to 6 2/5" (96.4 mm to 164 mm)
Length = 7 2/5" to 10" (188 mm to 255 mm)

The Optional Envelope Cassette

To load up to 20 envelopes at a time, use the optional envelope cassette.

NOTE: Instructions for installing the optional envelope cassette are given later in the “Optional Accessories” chapter.

To load envelopes follow these steps:

1. Align up to 20 envelopes, from right to left and from top to bottom, in a stack and place on a flat surface. Press down on the corners as shown (fig. 2.6). This makes the folds crisp and expels the air from the stack.

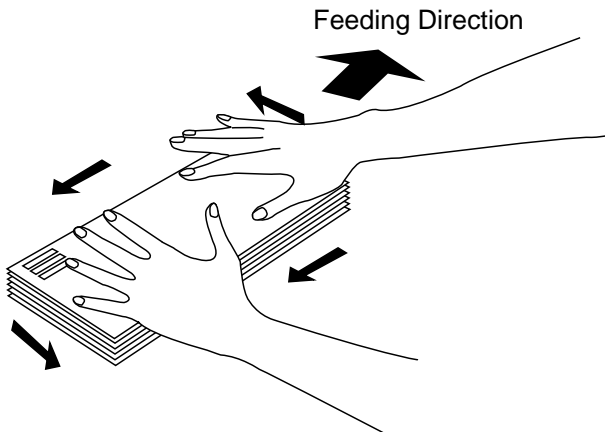


Fig. 2.6 *Align Envelopes*

2. Load the envelopes (address side up/flap side down) with the corner of the stack set into the corner of the tray as shown (fig. 2.7).

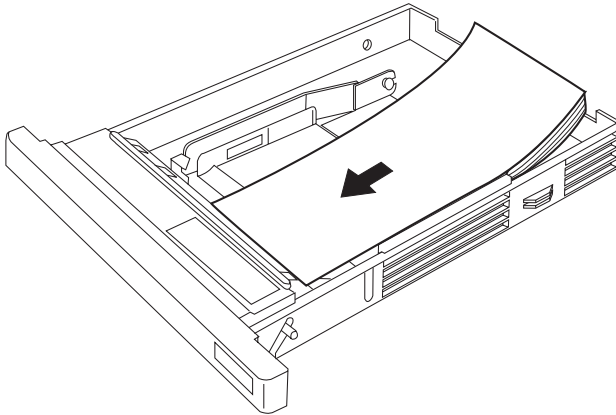


Fig. 2.7 *Load Envelopes in Tray*

3. Align the two envelope guides with the edges of the stack.

The guides must be neither too tight nor too loose. Adjust them so that there is no room between the guides and the envelopes, and so that the envelopes rest squarely in the tray.

4. Insert the cassette completely into the feeder tray.

Configuring the Envelope Cassette Your printer receives the necessary instructions to print on envelopes from your software application driver. Read the printing section of your software manual to see how your software supports envelope printing.

NOTE: If you have trouble with envelope jams, check the tray width adjuster to make sure it is not too tight and buckling the envelopes. Also make sure the envelopes you use are the correct size and type.

Adjusting Print Density

Normally, your laser printer produces a rich, black image on the paper. You may want to increase the print contrast setting as the toner cartridge is used. The adjustment dial for print contrast is inside the printer.

1. If the face-up output tray is installed, remove it. If the standard tray is open, close it. Push up the release button on the front to unlatch the front cover (fig. 2.8).

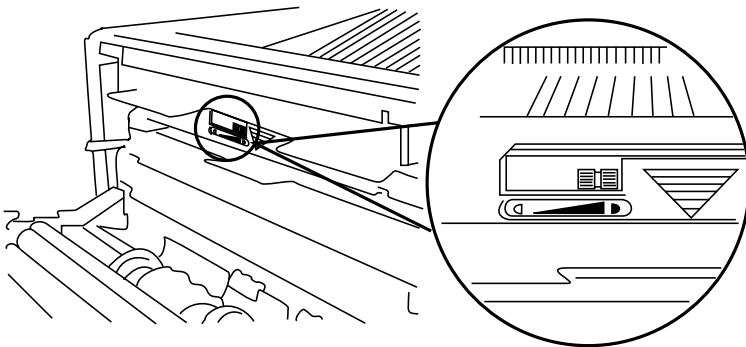


Fig. 2.8 *Adjust Print Density*

Moving the lever toward the display panel side of the printer darkens print. Moving the lever away from the display panel side lightens it. The lever has four settings from light to dark. As you move the lever, it clicks at each of the two positions in the middle. If you mainly print text, the lever should be set in the middle. If you are printing pages with detailed graphics, you may want to increase the print density.

Printing Diagnostics Pages

There may be times when you need to know the detailed status of your printer. This information is available by printing a test configuration page. The procedure below produces a test configuration page. (A cleaning sheet is produced also. Discard it—it is only needed when you install a new toner cartridge.)

1. If the Online indicator light is on, press the Online/Offline button to take the printer offline.
2. Press the Test/Cancel button.
3. Press the Online/Offline button to put the printer back online.

In a few seconds, two pages print. The first page is the test configuration page. (The second is the cleaning sheet.)

This test configuration page gives a complete report on the printer's current status. The page is divided into boxes and gives the following information:

- The product and printer name
- Printer identification (version of PostScript) and the number of pages printed to date

- Current PostScript settings including whether or not the start-up page is enabled, whether the password has been changed, and whether tray chaining is enabled. The default paper tray is also identified.

The picture of the printer in the upper right corner shows the current status of the printer's name, the default paper tray, the size paper the printer is configured for, and whether tray chaining is enabled or disabled.

- RAM size and current memory allocations for the printer's buffers are shown as percentages of total memory and as divisions of a pie.
- Communication settings and current emulations of those ports for parallel, LocalTalk, and serial. The serial setting includes current baud, flow control, parity, data bits, and stop bits.
- Timeouts for wait, manual feed, job, emulation, and ESP
- The number and name of the typeface outlines available.

A test configuration page serves two purposes; it produces a test page which indicates how the printer is currently configured and which may be used to troubleshoot the printer.

Chapter 3

Selecting Printer Languages

Introduction	3-1
How ESP Works.....	3-1
ESP Conflicts.....	3-4
Selecting Printer Languages.....	3-4
Selecting Printer Language: Printer Utilities	3-4
Selecting Printer Language: PostScript Commands.....	3-5
The Integers to Use with the Operators	3-6
Sending the Operators.....	3-6
setsoftwareiomode Operator.....	3-7
setdefaultemulation and setemulation Commands.....	3-7
Configuring the Parallel Port to PostScript	3-9
Configuring the Parallel Port to ESP	3-9
Configuring the Parallel Port to HP PCL.....	3-9
Configuring the Parallel Port to HP-GL.....	3-9
Configuring the Serial Port to PostScript.....	3-10
Configuring the Serial Port to ESP.....	3-10
Configuring the Serial Port to HP PCL	3-10
Configuring the Serial Port to HP-GL	3-10
Exiting Non-PostScript Printer Languages	3-11
Escape Sequence Syntax.....	3-11
Returning All Ports to the ESP Default.....	3-12
Operating Notes for Emulation Selection	3-13

Introduction

You may never need to change printer languages. Your printer has Emulation Sensing Processor (ESP); it samples the data at the beginning of a file and invokes the correct language (PostScript, HP PCL, or an optional installed emulation)—without the user having to change switch settings or send software commands ahead of jobs. ESP is the factory default setting.

However, if your printing needs require it, you may configure a particular port (or all the ports) to do only PostScript printing, only HP LaserJet series II printing, or only another optional emulation. You may reconfigure ports either through the PS Executive Series Utilities or through direct PostScript software commands. Instructions for both methods are given in this chapter; however, it is easiest to use the PS Executive Series Utilities for reconfiguration.

How ESP Works

Typically, when you install application software, you select the printer driver specific to the printer to which you expect to print. From that point on, the application prepares files in that particular printer language. Since most printers only understand their native language, files prepared in other printer languages print incorrectly. A file prepared in HP PCL and sent to a LaserJet printer usually prints incorrectly when sent to a PostScript printer; PostScript printers normally understand only PostScript.

However, the QMS-PS 410 printer has ESP, the unique ability to recognize different printer command languages without user intervention. All you do is send the file from a popular commercial application to the printer. You do not have to make any adjustments to either the printer or the file.

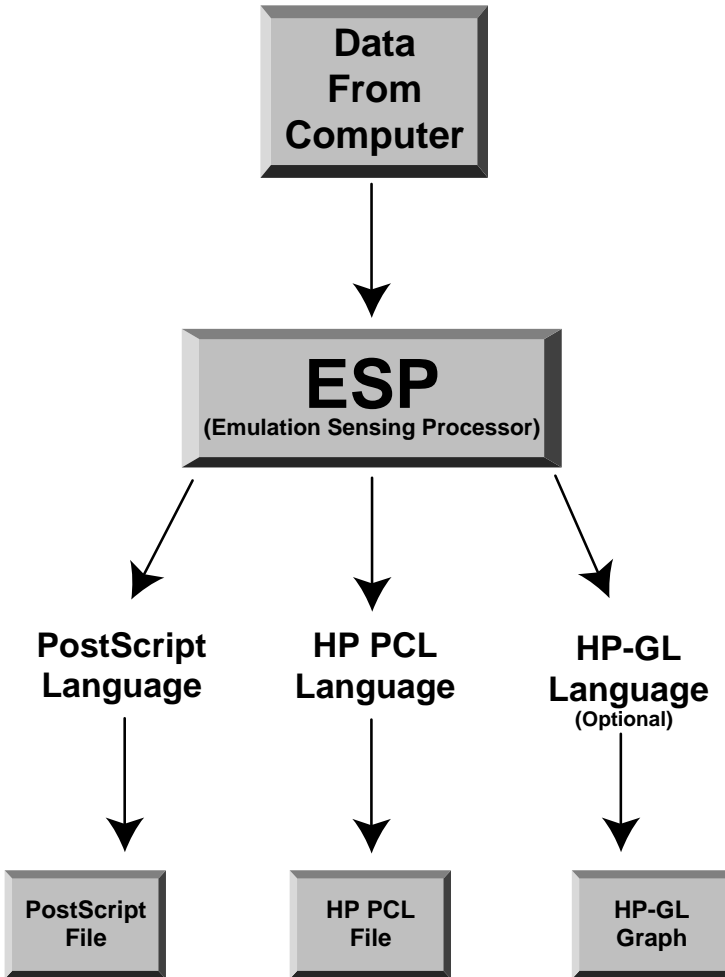


Fig. 3.1

When your printer is first installed, the default for two of its interfaces (serial and parallel) is ESP. Whether you have one or two host systems, the printer prints almost any type file as long as that file is in a format and language which the printer understands (PostScript, HP PCL, or a optional card emulation like HP-GL or LN03). It does this by recognizing command sequences commonly used by those languages at the beginning of a file. These command sequences normally consist of page formats and specific job parameters, like number of copies, page margins and fonts. The command sequence is usually transparent to you (the code is hidden from the user).

The only thing necessary to print a file when in ESP mode is that the software application program used to prepare the file must use the command sequences common to PostScript or HP PCL languages. A few of the popular application programs that have been successfully tested in ESP mode are

- | | |
|---------------------|---------------------|
| ■ WordPerfect | ■ Excel |
| ■ WordStar | ■ Harvard Graphics |
| ■ Ventura Publisher | ■ Adobe Illustrator |
| ■ Aldus PageMaker | ■ WingZ |
| ■ Microsoft Word | ■ Aldus FreeHand |
| ■ Microsoft Windows | ■ Dreams |
| ■ Lotus 1-2-3 | ■ PowerPoint |
| ■ MultiMate | ■ SuperPaint |
| ■ DisplayWrite | |

NOTE: The optional HP-GL emulation card expands the ESP choice to include HP-GL, a plotter language. For more

information on optional emulation cards, see appendix C, “Optional Accessories Available,” and chapter 4, “Using Optional Accessories.”

ESP Conflicts

Some applications do not provide command sequences at the beginning of a file, but send only text as their default mode. ESP selection errors may occur in such cases.

Some applications and interface configurations require changing the emulation wait timeout to adjust the time required between files that are sent. If you use two interface ports and send an HP PCL file and PostScript file simultaneously or less than 5 seconds apart, there may be a conflict. The simplest way to adjust the emulation wait timeout is with the PS Executive Utilities Program. To increase the timeout, use the Options category, Default Timeouts selection, and increase the set emulation wait timeout. (Microsoft Windows seems particularly sensitive to the emulation wait timeout.)

Selecting Printer Languages

There are two methods of configuring a printer port to a specific language: you may use the PS Executive Series Utilities Program (which you should have already installed) or you may use PostScript commands to change your mode selection. It’s faster and easier to use the utilities.

Selecting Printer Language: Printer Utilities

Using the PS Executive Series Utilities is the easiest way to change printer language if you are not using ESP mode. You have two different ways to change languages with the utilities.

1. In PS Executive, you may select the function Current Emulations to change configuration (see the utilities manual for exact details).
2. If you are on an IBM PC or compatible, rather than constructing a PostScript command file yourself, look in the PS Executive Series Utilities directory, PSEXEC, in a sub-directory called UTIL. Copy the language file of your choice to the desired printer port. These files are

ESP.SET to change to ESP (emulation selection).

HPPCL.SET to change to HP PCL printer language only.

PS.SET to change to PostScript printer language only.

HPGL.SET to change to HP-GL printer language (available on an emulation card) only.

EXIT_HP.SET to exit an HP emulation to PostScript only.

Selecting Printer Language: PostScript Commands

You may select the printer language by sending volatile or persistent PostScript commands (called operators) to the printer. Volatile commands last only for the current power cycle while persistent commands last until you change them. The volatile operators *setsoftwareiomode* and *setemulation* and the persistent operator *setdefaultemulation* specify with a numerical value the printer language and/or printer port you want.

setsoftwareiomode configures the printer port you are using (either serial or parallel) to a specific printer language mode. In this volatile command, you specify only one integer which identifies the printer language mode.

setemulation configures a specific port, whether you are currently using it or not, to a printer language. You specify in this volatile

command sequence the integer for both the printer language and the printer port to be configured.

setdefaultemulation is a persistent operator which acts the same as ***setemulation***, except that it lasts after power off. It configures both the port and the printer language mode.

Please read the sections which follow on the proper method for sending the command sequences and the integers which identify languages and ports.

The Integers to Use with the Operators The printer language modes are identified by an integer, that is, a numerical value. This integer(s) must be included prior to sending any operator. The identifying integers for printer language are

- Ø, PostScript
- 4, HP-GL (optional card)
- 5, HP PCL
- 12, LN03 (optional card)
- 200, ESP (emulation selection mode)

The identifying integers for printer ports are

- Serial interface = Ø
- Parallel interface = 1
- LocalTalk interface = 2

Sending the Operators Before sending any of the operators, check the following:

1. Make sure the printer is on, the Ready indicator is on, and the printer is **online**.
2. Make sure that your current port is configured to PostScript or ESP. (PostScript operators do not work with HP PCL language.) If you do not know your current port configurations, produce a test configuration page (see "Printing Diagnostic Pages").

setsoftwareiomode Operator The *setsoftwareiomode* operator is a volatile operator used to configure a port to a specific printer language.

To change a port from either ESP mode or PostScript mode to an HP printer language, create one of the following files with a text editor and send it to the port. The file on the right is for HP PCL and the file on the left is for HP-GL (available on an emulation card).

serverdict begin Ø exitserver	serverdict begin Ø exitserver
statusdict begin	statusdict begin
4 setsoftwareiomode	5 setsoftwareiomode
^D	^D

NOTE: The above files must be typed in lower case letters only. ^D is entered by typing the CTRL key and the letter D at the same time.

To change to ESP mode when in PostScript mode, substitute the integer 200 for 5 in the HP PCL command above. To change to PostScript mode only when in ESP mode substitute the integer Ø for 5 in the HP PCL command above.

setdefaultemulation and setemulation Commands You may wish to configure the language of each port without being in the current interface. This is accomplished through the operators, *setdefaultemulation* and *setemulation*. For example, you may

create one of the following command files in a text editor and use it to set the parallel port to HP PCL printer language.

serverdict begin Ø exitserver	serverdict begin Ø exitserver
statusdict begin	statusdict begin
1 5 setdefaultemulation	1 5 setemulation
^D	^D

The syntax for the *setdefaultemulation* and *setemulation* commands are

Syntax: **integer integer *setdefaultemulation***

and

Syntax: **integer integer *setemulation***

NOTE: PostScript identifies the printer ports as the first integer of the commands and the printer languages as the second integer of the commands. In the following examples, remember that *setdefaultemulation* commands are persistent, so they remain in effect even after power off. *setemulation* commands are volatile, so they only last for the current power cycle. Also, the files must be typed in lower case. The ^D is entered by typing the CTRL key and the letter D at the same time.

Configuring the Parallel Port to PostScript To configure the parallel port to PostScript mode from the parallel port, send one of the following commands. Type the file, pressing the ENTER key after each line.

```
serverdict begin {} exitserver serverdict begin {} exitserver
statusdict begin                statusdict begin
1 {} setdefaultemulation         1 {} setemulation
^D                               ^D
```

Configuring the Parallel Port to ESP To configure the parallel port to ESP, send one of the following commands. Type the file, pressing the ENTER key after each line.

```
serverdict begin {} exitserver serverdict begin {} exitserver
statusdict begin                statusdict begin
1 200 setdefaultemulation       1 200 setemulation
^D                               ^D
```

Configuring the Parallel Port to HP PCL To configure the parallel port to HP PCL, send one of the following commands. Type the file, pressing the ENTER key after each line.

```
serverdict begin {} exitserver serverdict begin {} exitserver
statusdict begin                statusdict begin
1 5 setdefaultemulation         1 5 setemulation
^D                               ^D
```

Configuring the Parallel Port to HP-GL To configure the parallel port to HP-GL (optional card), send one of the following commands. Type the file, pressing the ENTER key after each line.

```
serverdict begin {} exitserver serverdict begin {} exitserver
statusdict begin                statusdict begin
1 4 setdefaultemulation         1 4 setemulation
^D                               ^D
```

Configuring the Serial Port to PostScript To configure the serial port to PostScript language, send one of the following commands. Type the file, pressing the ENTER key after each line.

```
serverdict begin Ø exitserver serverdict begin Ø exitserver
statusdict begin                statusdict begin
Ø Ø setdefaultemulation          Ø Ø setemulation
^D                                ^D
```

Configuring the Serial Port to ESP To configure the serial port to ESP, send one of the following commands. Type the file, pressing the ENTER key after each line.

```
serverdict begin Ø exitserver serverdict begin Ø exitserver
statusdict begin                statusdict begin
Ø 2ØØ setdefaultemulation        Ø 2ØØ setemulation
^D                                ^D
```

Configuring the Serial Port to HP PCL To configure the serial port to HP PCL, send one of the following commands. Type the file, pressing the ENTER key after each line.

```
serverdict begin Ø exitserver serverdict begin Ø exitserver
statusdict begin                statusdict begin
Ø 5 setdefaultemulation          Ø 5 setemulation
^D                                ^D
```

Configuring the Serial Port to HP-GL To configure the serial port to HP-GL (optional card), send one of the following commands. Type the file, pressing the ENTER key after each line.

```
serverdict begin Ø exitserver serverdict begin Ø exitserver
statusdict begin                statusdict begin
Ø 4 setdefaultemulation          Ø 4 setemulation
^D                                ^D
```


Exiting Non-PostScript Printer Languages

To exit a non-PostScript language such as HP PCL, you must send a command in the HP language since that is all your printer understands at that time. HP commands are called “escape sequences” since they begin with the ASCII value for an escape key.

Escape Sequence Syntax

The generic version, or syntax, of an escape sequence is

Syntax: <ESC><Ø><Ø4>

- | | |
|--------------------|--|
| <ESC> | The <ESC> character must have a decimal value of 27. You need to find a way to enter the hexadecimal, decimal, or octal value, depending on your system. (To enter the escape code most systems require you to press the ALT key while typing Ø27 on the numeric keypad.) |
| | The character must have a decimal value of 127. You need to find a way to enter the hexadecimal, decimal, or octal value, depending on your system. (To enter the escape code most systems require you to press the ALT key while typing 127 on the numeric keypad.) |
| <Ø> | The Ø parameter is the numerical value that indicates the exit to PostScript. |
| <Ø4> | The <Ø4> parameter is the end-of-file character. To enter a <Ø4> character on most systems, hold down the ALT key and press ØØ4 on the numeric keypad. |

NOTE: You cannot exit directly to the default ESP mode. You must first exit to PostScript (Ø) using the escape sequence or the EXIT_HP.SET file from the PS Executive Series Utilities; then return to ESP using the appropriate port command in the “Using the *setdefaultemulation* and *setemulation* Commands” section.

The command goes into effect immediately when you enter the parameter.

NOTE: You may use this command as an end-of-file marker. For example, if you know that you want to exit HP PCL emulation at the end of a particular job, you may insert the command at the end of the file and your next file prints in the desired mode.

Returning All Ports to the ESP Default

If you experience problems either entering or exiting a printer language, you may return the printer to its default ESP mode by any one of the following:

1. Enter the PS Executive Utilities' Special Menu and choose "Reset Default Parameters."
2. Send the following PostScript command if you are in ESP or PostScript mode:

```
serverdict begin Ø exitserver
statusdict begin
resettodefaults
^D
```

3. Return ports to factory default through the Control Panel using the following procedure:
 - a. Turn off the printer.
 - b. Hold down the TEST/CANCEL and ONLINE/OFFLINE buttons.
 - c. Turn on the printer while keeping the buttons down.

- d. Wait until the online light comes on; then release the TEST/CANCEL and ONLINE buttons. Your printer is now reset to factory defaults.

Operating Notes for Emulation Selection

- The most common use of the QMS-PS 410 printer (if attached with both serial and parallel cables and one host system) is to configure one port for HP PCL emulation and one port for PostScript mode. You may then direct your files to a particular port (either the LPT port or the COM port) without having to send software commands to change the port's configuration or use the ESP mode for both ports.
- A note to keep in mind if you use the printer in a shared environment (more than one host system is attached to the printer) is to keep your port set to ESP mode. If you do change the emulation, always return whatever port you configured to ESP. This assures that your printer partners are not inconvenienced.
- The PostScript operators, *setsoftwareiomode*, *setdefaultemulation*, and *setemulation* must be sent through a port configured either to PostScript or ESP mode. We recommend that if you are using your printer with more than one interface cable, you have at least one interface configured to PostScript mode. This ensures that at least one interface is able to understand the printer's native language, PostScript, at all times.
- To change from an HP PCL emulation, you must follow the instructions under the previous section "Exiting Non-PostScript Printer Languages."

- If you are communicating through the serial port and parity settings for your host and your printer do not match, you may experience a loss of data and only part of the file will print. The printer's parity setting is listed on the test configuration page. (Instructions for producing a test configuration page are in the chapter, "Printer Use.") Adjust your host computer and/or software application program to match.
- When you are working in emulations, you should not concatenate files. Concatenate means to merge several independent data sets, or jobs, to create one large data set. Files must be separated with a form feed at the end of the file.

Chapter 4

Using Optional Accessories

Introduction	4-1
About Optional Accessories	4-1
The Paper Feeder Tray	4-2
Installing a Feeder Tray	4-3
Putting Paper into the Optional Cassettes	4-7
Installing a Legal Cassette	4-12
Configuring for Multiple Cassettes	4-14
Optional Cards	4-15
Memory Upgrades	4-16
Installing Memory Upgrade Modules	4-17

Introduction

The QMS-PS 410 printer has many options which expand the printer's capabilities. Available from your QMS vendor are

- 250-sheet lower paper cassettes in A4, letter, legal, Executive, or B5 size
- An envelope cassette
- Cards which contain typeface families (such as the ProCollection for HP emulations) or emulations (such as HP-GL or LN03)
- Memory upgrades (RAM expansion) in 1, 2, or 4 MB sizes

An accessories list is included in appendix C, "Optional Accessories Available."

About Optional Accessories

An optional feeder tray which holds the various sizes of paper cassettes attaches to the bottom of the printer. After attaching an optional feeder tray, it becomes an integral part of your printer by enhancing its functionality. One feeder tray holds all sizes of cassettes.

Additional typeface and/or emulation cards may be added to the QMS-PS printer to further expand your printer's capability. These credit-card size cards are easily inserted in slots adjacent to the printer's display panel.

Memory upgrades are made by inserting a small module into an opening at the interface connection area of the printer. These

modules, by expanding RAM, provide extensive font and/or file handling and storage capabilities.

The Paper Feeder Tray

Since all paper cassettes slide into a paper feeder tray, the feeder tray must be installed first. The only tool necessary to install the paper feeder tray is a small screwdriver (supplied with the accessory). Since the feeder attaches to the printer's bottom and the cassette slides into the feeder, no extra space is needed.

NOTE: Once the feeder tray is installed, use PS Executive Series software to select this tray as the default.

Unpack the feeder tray and remove packing materials and tape. Taped to the feeder tray is a plastic bag containing four (4) screws and the screwdriver. Figure 4.1 shows the feeder tray and an example of the paper cassettes available for use with the feeder tray. You may purchase additional paper or envelope cassettes at any time.

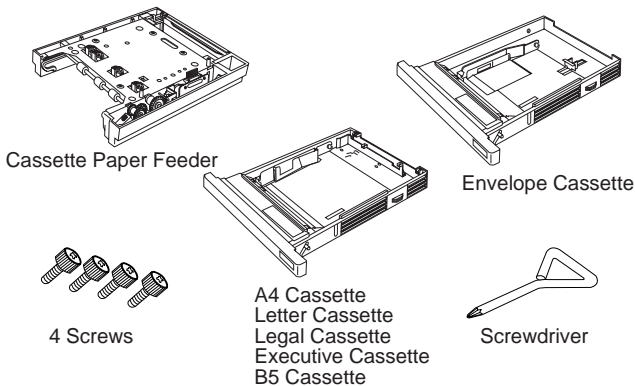


Fig. 4.1 *The Cassette Feeder Shipset*

WARNING! The printer's controller board is extremely sensitive to static electricity. If you install accessories that contact the board, like the cards or memory upgrades, make sure you discharge any static electricity before handling accessories. Do this by touching the printer's metal casing before touching the accessory. Do not walk across carpet while holding the accessory.

Installing a Feeder Tray

If the feeder tray is already installed and you are only installing a cassette, skip this section and go to the next one. If not, use the following procedure.

1. Before installing the feeder tray, disconnect the power cord and interface cable(s) from the back of the printer.
2. Place the feeder tray on a stable, horizontal surface and remove the cassette from the feeder tray as shown in figure 4.2.

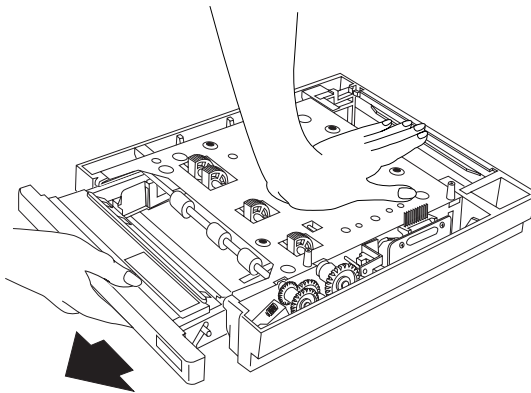


Fig. 4.2 Remove Tray from Feeder Cassette

Make sure your hands are placed as shown in figure 4.2 and the feeder tray assembly rests on a flat surface. If you hold the tray assembly in mid-air and attempt to remove the cassette, you will catch your hand between the feeder tray and the cassette.

3. Turn the printer on end and rest it on a stable, horizontal surface. Hold the feeder tray on both sides and position it against the printer's bottom as shown in figure 4.3.

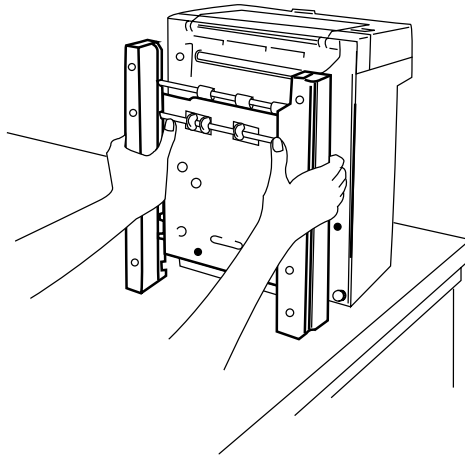


Fig. 4.3 *Positioning the Feeder Tray*

4. First, align the left side of the feeder tray with the bottom of the printer (if you have the feeder in the correct position, the left side is the side without the printed circuit board). Next, swing the right side of the feeder into position. Be careful to align the printed circuit board on the feeder properly with the bottom of the printer. Attach the printed circuit board to the connector in the printer by fitting the two projections at the top and bottom of the printed circuit board into the corresponding holes in the printer (fig. 4.4).

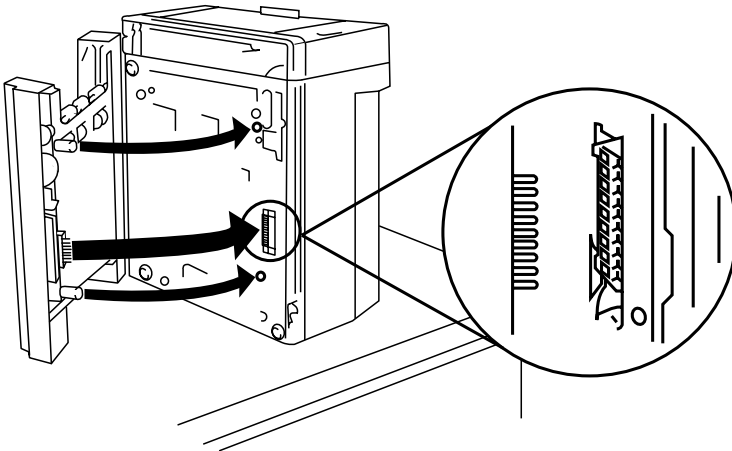


Fig. 4.4 *Position Tray Feeder under Printer*

5. Fasten the feeder to the printer using the four screws provided with the shipment. First, tighten all four screws with your fingers, then tighten them securely with the screwdriver provided.

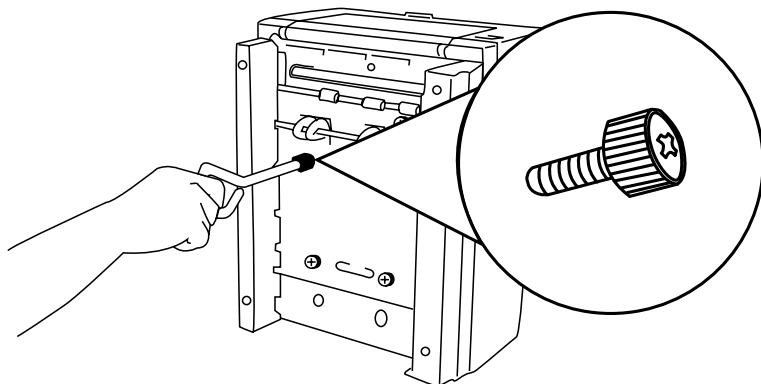


Fig. 4.5 *Fasten Feeder to Printer Bottom*

6. Place the printer back in its normal orientation and verify that the feeder tray is securely installed on the printer. Make sure that there is no gap between the feeder and printer, and that the feeder is not loose (fig. 4.5).

Putting Paper into the Optional Cassettes

Load paper into the optional cassette with the printing side face-up. This is the reverse of the way you put paper in the standard tray.

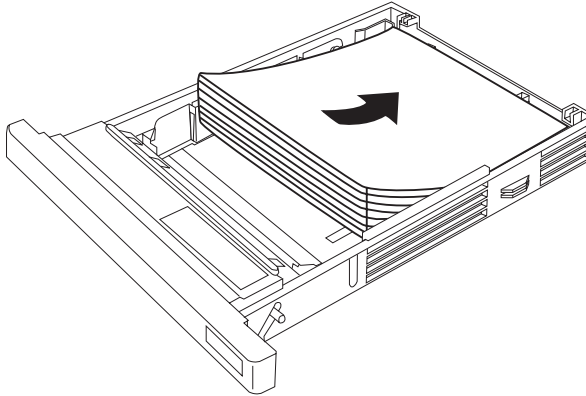


Fig. 4.6 *Putting Paper in the Tray*

1. You may load up to 250 sheets into any of the optional paper cassettes. Align the edges of the paper you wish to insert into the cassette by tapping the paper loosely on a flat surface. Slide the paper into the cassette from the front side as shown in figure 4.6.

2. Make sure the paper is under the white plastic tabs at the rear of the cassette (fig. 4.7). Pressing down on all four corners of the paper stack ensures that the paper is loaded correctly.

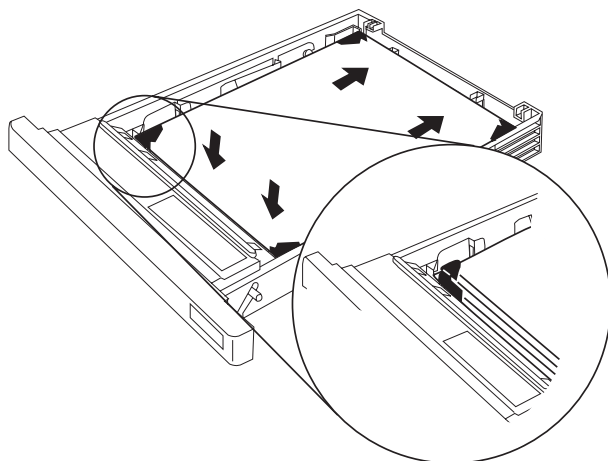


Fig. 4.7 *Push Paper Under White Plastic Tabs*

3. Press down on the front of the stack to place it under the metal retaining clips at the front of the cassette. See figure 4.8.

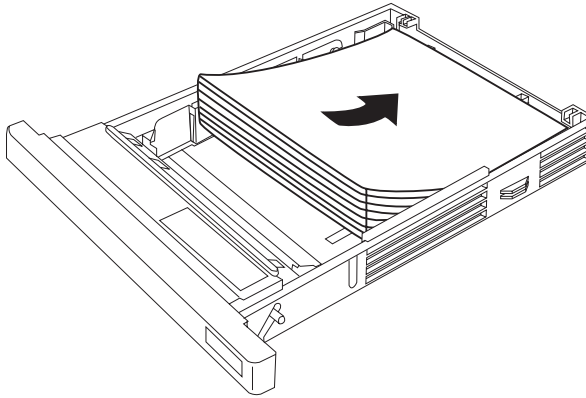


Fig. 4.8 *Place Paper Under Metal Clips*

Installing the paper cassette into the feeder tray is a simple procedure. Any size paper cassette, except legal, slides all the way into the feeder (see legal instructions later in this chapter). Make sure the cassette is firmly seated.

Cassette types and sizes and the weights of paper used with each of the cassettes are shown below (Table 4.1).

Type	Size	Weight	Printout Delivery	Loading Capacity
Plain Paper	Letter: 8 1/2" x 11" Legal: 8 1/2" x 14" A4: 210 x 297 mm B5: 182 x 257 mm Exec: 7 1/4" x 10 1/2"	60-105 g/m ²	Face-down/up	Approximately 250
Transparency Films	Letter, A4		Face-up	Approximately 50
Labels	Letter, A4		Face-up	Approximately 50
Envelopes	98 x 190 to 162 x 250 mm	60-90 g/m ²	Face-up	Approximately 50

There are some points to keep in mind as you install optional cassettes. Many of these points apply to any paper tray. They are

- Once an optional tray is installed, use the PS Executive Series Utilities software to select the tray. The QMS Paper Handler driver in the utilities allows easy selection and use of the optional paper tray. See the *PS Executive Series Utilities* manual for details.
- Paper should be placed in the cassette in the proper position or excessive curl may occur. See the section on paper in the “Printer Use” chapter and follow the same guidelines for the optional cassette.
- An optional cassette expands your paper handling capacity to 320 sheets. The regular output tray does not hold that many sheets. If too many sheets stack in the output cassette you may experience jams.
- If you use an optional cassette to feed envelopes or transparencies, remember to use the face-up output tray.

Installing a Legal Cassette

To install a legal size cassette

1. The legal cassette is longer than the printer and extends beyond the rear of the printer when in place. To install the legal cassette, remove the flap from the back of the printer by grasping it in the middle. Flex the flap to disengage it from the holes (fig. 4.9).

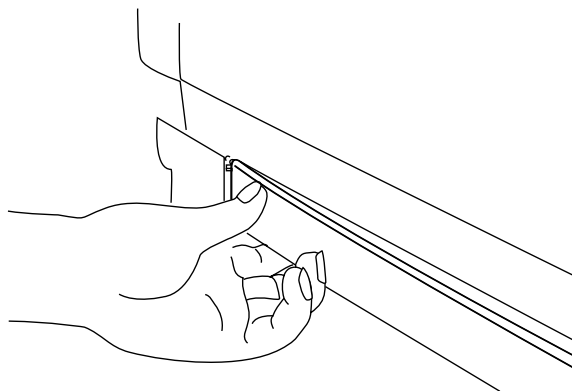


Fig. 4.9 *Remove Flap from Printer Back*

2. The legal cassette includes a rear cover to keep out foreign material such as dirt and dust. Insert this cover into the same holes from which the back flap was removed. You may leave this cover permanently installed. It is compatible with the other cassettes (fig. 4.10).

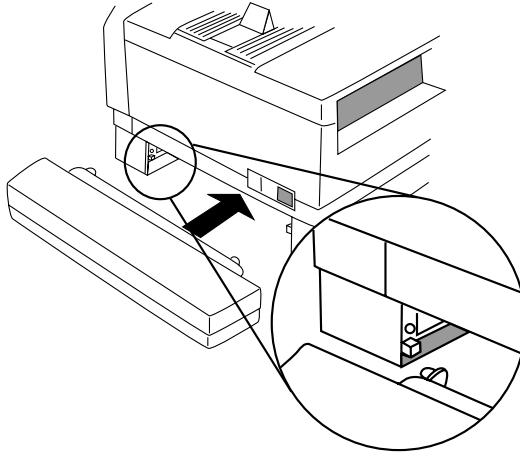


Fig. 4.10 *Install Legal Cassette Dust Cover*

Configuring for Multiple Cassettes

With an optional cassette, you have a choice of which tray your printer draws from and in what order it draws. The method for doing this varies from system to system, but there are usually three options.

1. Your software application package may include a specific procedure for sending paper source commands directly to the printer. Check your application documentation.
2. The PS Executive Series Utilities offers a menu-driven program for paper tray selection. This is often the best and easiest way to configure your paper source. For details on selecting trays see the “Current Paper Source” for a PC or “Using the QMS Paper Handler” for a Macintosh.
3. If you choose not to configure the paper source through the application or the utility program, a file containing the PostScript commands may be written using an editor, then sending the file to the printer. See the chapter “PostScript: Technical Overview” for the actual PostScript commands.

NOTE: The changes made to the paper source are immediately active after changing through PS Executive Series Utilities or by PostScript operator command. However, the paper tray indicator lights on the printer do not change until a page is actually drawn from the tray. Thus checking indicator lights after making the change is not an accurate way to check the receiving by the printer of the command.

Optional Cards

Cards contain either printer emulations, such as HP-GL, or typefaces (fonts) which are not resident on the printer. The printer supports two cards at once. Many optional cards are available. For a more complete listing than what is covered here, contact your QMS vendor.

Caution: The printer must be offline before inserting or removing cards. Press the online button to turn the indicator off. If you forget to take the printer offline, turn the printer power off and back on to regain access to the printer's resident fonts and data stored in the printer's memory. Also remember that fonts cards may go in either slot A or B; however, emulation cards only go in slot B.

To install a card

1. Make sure the printer is offline. The indicator light should be off.
2. To insert a font card, slide it into either slot A or B (fig. 4.11) with the label side facing up. You should hear the card snap into place.

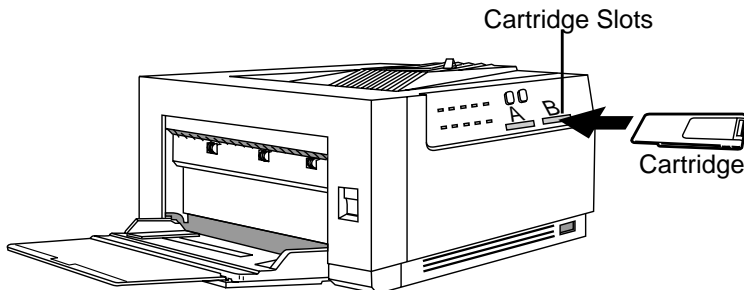


Fig. 4.11 Cartridge Slots

3. To insert an emulation card, slide the card only into slot B (fig. 4.11), label side facing up. You should hear the card snap into place.
4. Put the printer back online.

To remove a card

1. Put the printer offline.
2. Pull the card out gently.
3. Put the printer back online.

NOTE: If you are using a software application package, make sure the software driver installed supports the fonts in the card, if you wish to use those fonts. If not, contact your software application manufacturer for support.

Memory Upgrades

The 1, 2, or 4 MB memory upgrade modules allow you to print more complex graphics. They provide memory to hold downloaded fonts, forms, and macros, and allow the printer to accept larger jobs.

■ 1 MB Memory Upgrade Module

This board offers space for more fonts and forms in memory.

■ 2 MB Memory Upgrade Module

This board is excellent for users who need to store a larger number of fonts and forms in memory.

■ 4 MB Memory Upgrade Module

A single printer shared by many users often requires a 4 MB upgrade. It expands the printer's memory to allow for sophisticated forms and graphics, and for many fonts.

Installing Memory Upgrade Modules

Memory modules contain electrical components which are extremely sensitive to static electricity. If possible, wear an anti-static wristband during the install procedure. Otherwise, before removing the board from the anti-static bag in which it is packaged, hold the bag while touching any base metal surface on the rear of the printer. **Avoid walking about, especially on carpet. Handle the board carefully, and try to handle it only by the edges.**

Read all the instructions carefully before beginning and make sure you understand them. The only tool necessary is a small Phillips screwdriver.

1. Turn the printer off and remove the power cord. Disconnect all interface cables (parallel, serial, and LocalTalk) from the printer.

2. Under the printer's interface ports is a sheet metal access panel (fig. 4.12). Use the Phillips screwdriver to remove the screws from the sides of the panel. Remove the access panel.

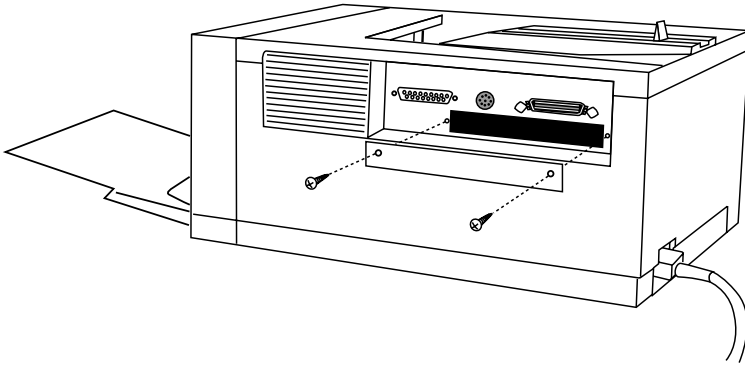


Fig. 4.12 *Remove Screws from Side of Panel*

3. Remove the memory upgrade module from the anti-static bag along with the packet containing two small Phillips head screws.
4. Align the memory upgrade module on the access panel by matching the holes on the panel and the end of the memory upgrade module. Place the two screws (those included with the memory upgrade module) through the upgrade module and access panel to fasten them together.

5. Slide the module into the printer using the slot guides.

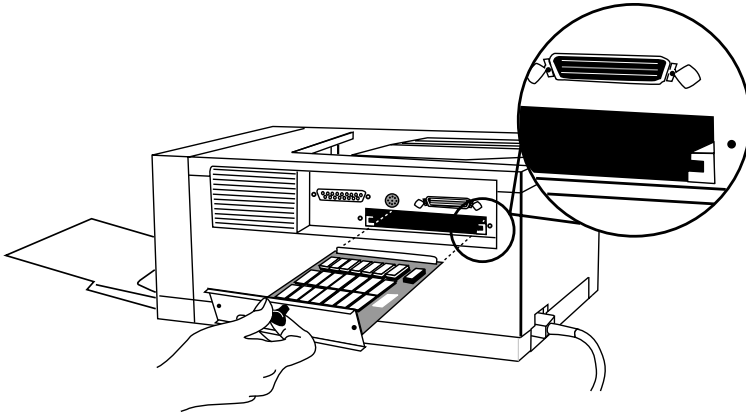


Fig. 4.13 *Slide Module into Printer*

6. Make sure the module is firmly seated by placing your free hand on the front of the printer and firmly pushing against the knob of the access panel.
7. Replace the screw at each corner of the access panel. Plug in power cord and interface cables; then turn on the printer.
8. Print a test configuration page by taking the printer offline; then push the TEST/CANCEL button. Wait for the two pages to print. The test configuration page should show the RAM size according to the size module you installed.

Chapter 5

Professional Printing

Introduction	5-1
The Resident Typeface Families	5-2
About Typeface and Fonts	5-4
Point	5-6
Pitch.....	5-6
Fixed spacing	5-7
Proportional Spacing.....	5-7
Character Set	5-8
Family	5-8
Italic and Oblique Forms	5-9
Stroke Weight	5-9
Page Orientation	5-10
Rotation.....	5-11
Page Design	5-12
A Typeface Sampler.....	5-13
Helvetica	5-13
Helvetica Condensed	5-13
Helvetica Narrow	5-14
ITC Avant Garde Book.....	5-14
Times Roman	5-14
Courier	5-14
Palatino	5-15
Adobe Garamond	5-15
New Century Schoolbook.....	5-15
ITC Bookman	5-15
Zapf Chancery Medium Italic.....	5-16
Symbol	5-16
ITC Zapf Dingbats	5-16

Introduction

Now that you have installed your printer and it is functioning correctly, you're ready to design a more professional page.

PostScript allows your printer to place words and even graphics any place on the page, in any size, from so small you can't even see it, to so large it is limited only by the paper size. You can place letters at any angle, even rotate them. The possibilities are limitless.

If you have correctly installed a printer driver, you are ready to put the QMS-PS printer to work. Create a file within your software program and send it to the printer. The software takes over from this point. You should be able to use the different typefaces that come resident in the printer as long as they are contained in your application's printer driver. Review the software documentation to determine support for your printer's fonts.

If you cannot print your document in any of the fonts listed below, the problem is probably with the software printer driver (if you have a PC), or that the screen fonts are not installed (if you have a Macintosh). Try to print a sample file from the PS Executive Series Utilities program which came with your printer. If that sample prints fonts that you can not print from within your software program, contact your software manufacturer for an updated driver.

The Resident Typeface Families

The following typefaces are resident in your printer. See your QMS vendor if you are interested in other typeface families.

Serif

Times Roman

Times Bold

Times Roman Italic

Times Bold Italic

Courier

Courier Bold

Courier Oblique

Courier Bold Oblique

Palatino

Palatino Bold

Palatino Italic

Palatino Bold Italic

New Century Schoolbook

New Century Schoolbook Bold

New Century Schoolbook Italic

New Century Schoolbook Bold Italic

Adobe Garamond Regular

A dbe Garamond Regular Italic

Adobe Garamond Bold

A dbe Garamond Bold Italic

Adobe Garamond Semi

A dbe Garamond Semi Bold Italic

ITC Bookman Light

ITC Bookman Demibold

ITC Bookman Light Italic

ITC Bookman Demibold Italic

	<p>ITC Zapf Chancery Medium Italic</p> <p><i>This typeface does not come in any other but the calligraphic italic style</i></p>
Sans Serif	<p>Helvetica</p> <p>Helvetica Bold</p> <p><i>Helvetica Oblique</i></p> <p><i>Helvetica Bold Oblique</i></p> <p>Helvetica Condensed</p> <p>Helvetica Condensed Bold</p> <p><i>Helvetica Condensed Oblique</i></p> <p><i>Helvetica Condensed Bold Oblique</i></p> <p>Helvetica Narrow</p> <p>Helvetica Narrow Bold</p> <p><i>Helvetica Narrow Oblique</i></p> <p><i>Helvetica Narrow Bold Oblique</i></p> <p>ITC Avant Garde Book</p> <p>ITC Avant Garde Demibold</p> <p><i>ITC Avant Garde Book Oblique</i></p> <p><i>ITC Avant Garde Demibold Oblique</i></p>
Other typefaces:	
Symbol	<p>! ∇ # ∃ % & ε () *</p> <p>÷ + − / A B X Δ E</p> <p>Φ Γ Η Ι ϑ Κ Λ Μ Ν Ο Π</p> <p>Θ Ρ Σ Τ Υ ζ Ω Ξ Ψ Ζ ®</p> <p>© ™ γ ! α β χ δ ε φ</p>
ITC Zapf Dingbats	

All of the previous typeface families are authentic; they are licensed and carry the true name.

About Typeface and Fonts

Many terms and phrases in desktop publishing originate from the language of printers and typesetters. This chapter explains common words and phrases used when printing with typefaces. The more you know about typeface and your printer's capabilities, the more you can improve the appearance of your documents.

The following two words, **typeface** and **font** are two words you should know. Often confused, typeface is the larger category, while font is a subset of typeface.

Typeface Typeface refers to the style of the *face of printing type*. Typeface does NOT define a particular size, but only a style or licensed design.

Font A font is a complete collection of characters in one typeface *all of one size*, like 10-point Courier. Although you hear font used more generally as if referring to a kind of typeface, a font is defined by being of the same style and size.

You may notice that the printer's resident typefaces are divided into two sections. One way of classifying different kinds of typeface is to group them as

- serif
- sans serif

A serif is a decorative line or tail on the ends of lines forming a letter. Serifs are usually on the lower half of a letter, and they have

been called feet and curlicues. Times-Roman, Courier, Palatino, Garamond, New Century Schoolbook, ITC Zapf Chancery, and ITC Bookman Light have serifs.

In figure 5.1, only the letters e and o do not have serifs.

Times Roman

Fig. 5.1 Serif

Sans serif (sans is French for *without*) indicates a typeface without any of these small tails. Sans serif typeface is decorative by the shape and styling of its letters. Sans serif typeface has less detail than serif typeface. ITC Avant Garde Gothic, and Helvetica are sans serif.

In figure 5.2, the slight curving at the bottom of the letters **t** and **a** is not a serif. This curve is part of the line forming the letter and not a decorative line added on.

Helvetica

Fig. 5.2 Sans Serif

Point Point size refers to the vertical height of a typeface (fig. 5.3). Point is a unit of measure originally used by typesetters to indicate the height of a piece of metal type. Computer typefaces are harder to measure since they are not physical objects. However, the typefaces provided with the printer, licensed from Linotype, are all sized by true printing standards.



ABCABCABCABCABC

Fig. 5.3 8, 10, 24, and 36 Point Sizes

Pitch Pitch refers to the number of characters per horizontal inch (fig. 5.4). Ten-pitch Courier prints ten characters per inch. Hence, ten-pitch type is wider than twelve-pitch type since only ten characters fill a horizontal inch rather than twelve. Another name for this measurement is cpi, or characters per inch.

10-Pitch Courier

12-Pitch Courier

Fig. 5.4 Ten and Twelve Pitch Courier

Fixed spacing Fixed spacing, also known as monospacing and fixed pitch, refers to a typeface whose characters all have uniform and equal spacing (fig. 5.5). A fixed-spaced typeface is useful for spreadsheets and other documents needing columnar data. Fixed spacing is the opposite of *proportional spacing*. Only one of this printer's typefaces is a monospaced typeface: Courier.

Alphabet

Fig. 5.5 Fixed Spacing

Proportional Spacing The term *proportionally-spaced* refers to a typeface that varies the size of each character (fig. 5.6). For example, the letter *i* is thinner than the letter *m* and should take up less space. Proportional spacing saves page space and is easier on the eye. This manual is set in Times, a proportionally-spaced typeface.

Alphabet

Fig. 5.6 Proportionally Spaced

Frequently used in opposition to the term fixed-spacing, *proportionally-spacing* places the characters according to their individual sizes, and can increase legibility and readability. All of your printer's typefaces except Courier are proportionally spaced typefaces.

Character Set A character set is a collection of symbols. The symbols contained in character sets are designed to perform various printing applications. Many sets are composed of the alphabet, the numbers zero through nine, and an assortment of other symbols, such as the dollar sign and the ampersand.

Family A *typeface family* is a group of similar typefaces. For example, the Times-Roman typeface family has four members: Times Roman, **Times Bold**, *Times Italic*, and ***Times Bold Italic***

Italic and Oblique Forms Italic typeface derives from the early sixteenth century and is the printed form of cursive writing. Italic forms are individually crafted typefaces. Oblique type forms are not designed and crafted individually but are mechanically-slanted versions of the upright form from which they derive. Oblique forms can be very attractive in their own right. The term refers to the method of design. (The following examples are all of the same point-size.)

This is Times Roman

This is Times Roman Italic

This is Avant Garde Book

And Avant Garde Book Oblique

Fig. 5.7 Times-Roman & Avant Garde Book Typeface

Stroke Weight Stroke weight refers to the degree of print density, or darkness of the printing. These weights are frequently classified as bold, medium, and light. PostScript can allow you to print a multitude of different weights, however, not every software program can access this many.

Page Orientation Orientation refers to the direction of print on the page (fig.5.8). Portrait orientation reads from left to right, across the more narrow dimension of the page. This manual is in portrait orientation. Landscape orientation also reads from left to right but places the print across the wider dimension of the page. This type of printing is commonly used for spreadsheets and tables. Both terms originated in painting; a portrait is usually a vertical view; a landscape is usually a horizontal view.

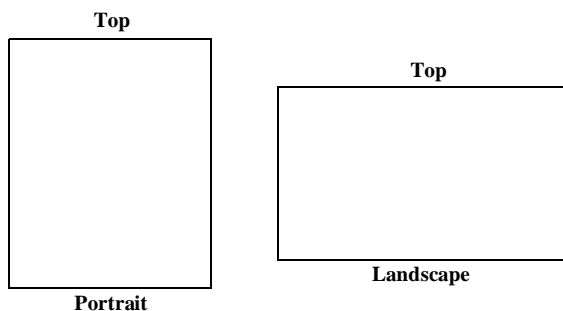


Fig. 5.8 Orientation

Rotation Although many software programs only access portrait and landscape, PostScript is capable of printing text at any angle on the page. Text can even be rotated.

Page Design

One rule to know when designing documents is keep it simple. Avoid cluttering your documents with unnecessary font changes. It takes experience and talent to skillfully blend a wide range of typefaces.

Always consider your reader first. Select a typeface that's best for your particular document and consider the meaning of your words. What are you trying to communicate? A strong, no-nonsense typeface, like Helvetica, proclaims its message loud and clear. This is why sans serif type is often used for signs, like **NO PARKING**. Helvetica is considered so strong it does not even have a true Italic form, since Italic forms convey grace.

Skillful typeface use in page design also increases readability as well as legibility. Newspapers are a good example of readability. Typeface chosen for text and headlines varies in size, and text is contained in columns two to three inches wide. Thus the eye does not have to travel far and the reader does not lose his place.

Other aspects of design such as word spacing (justified vs. unjustified), line spacing, letter spacing within words, upper case and lower case letters, all affect legibility.

Many books are available on page layout and design as well as typography. Many words have meanings that apply only to typography. (See figure 5.9 for some of them.) However, page design has no set rules. If you design a document and don't have time to study the craft, remember the rule: *keep it simple*.

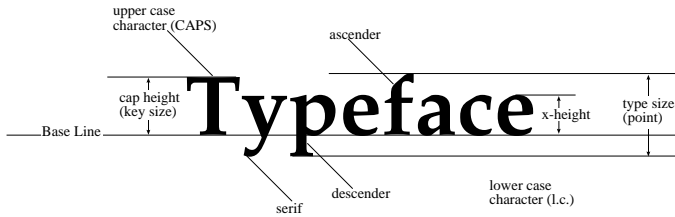


Fig. 5.9 Typeface Terms

A Typeface Sampler

Your QMS-PS 410 printer offers you a wide selection of resident typefaces from which to choose.

Helvetica Helvetica is a popular typeface, a modification of a kind of sans serif typeface called Grotesque. Helvetica is used widely in publishing and is admired for its clean lines, although it can be repetitive to the eye, **ESPECIALLY WHEN IN ALL CAPS. This typeface has a strong bold and *bold oblique form*.** There is no italic form. *Helvetica oblique is the slanted form.* Helvetica is a proportionally-spaced typeface.

Helvetica Condensed True to its name, Helvetica Condensed is a typeface made by mathematically scaling plain Helvetica. **There is a bold form and an oblique form. In addition, there is a bold oblique form.** Helvetica Condensed complements the Helvetica typeface and can be used when space is at a premium.

Helvetica Narrow Problem! Your space is limited, your copy is too long, and you need a typeface that's bold and attention-getting. Answer: use this typeface. This face conserves space, gets attention, and is readable. There is a **bold form**, an *oblique form* and a ***bold oblique form***.

ITC Avant Garde Book ITC Avant Garde Book is a sans serif typeface dating from 1970. ITC Avant Garde Book has a highly-stylized look, particularly in some of the symbolic characters like %% and @. **There is a bold form called "demibold"** and *an oblique form, which simulates an italic*. In addition, ***there is a demibold, oblique form***. ITC Avant Garde is useful for headlines and documents that need a strong contemporary style.

Times Roman Times Roman is a popular typeface adapted from older forms. Once used in the London *Times*, it is considered an elegant, bookish typeface. It has been popular in the United States for decades. This typeface is excellent in a wide variety of applications except for small, highly condensed formats, where Helvetica would prove superior. *The Times Roman italic is particularly graceful while the bold italic is thicker*. Times Roman is a proportionally-spaced typeface.

Courier Courier is a newer typeface that was designed for electric typewriters by IBM. **Courier has a bold form that is thick and stylish. The oblique form of Courier has its merits and uses; as does the bold oblique form of Courier.** The Courier family may be used for counterpoint with Times Roman or Helvetica. Unlike Times Roman and Helvetica, Courier is a fixed-spaced typeface.

Palatino Palatino is a graceful typeface designed by Hermann Zapf. This typeface is highly legible and often used for headlines. It has a **bold form** and a *true, crafted italic form*. **The bold italic form is also elegant.** Palatino is a popular and useful typeface, always in good taste.

Adobe Garamond This classic typeface was named for Claude Garamond, a 16th century typographer and royal court printer. The typeface that bears his name is one of the most venerable in use today. It conserves space while making small type quite readable. It's one of the few typefaces you can do almost anything with, and simply not go wrong. There are six forms resident in the QMS-PS 410 printer: Garamond Regular, *Garamond Regular Italic*, **Garamond Bold**, ***Garamond Bold Italic***, **Garamond Semibold**, and **Garamond Semibold Italic**.

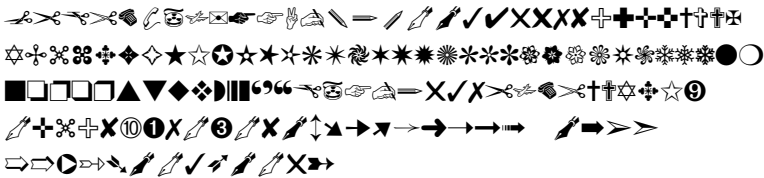
New Century Schoolbook Like Palatino, New Century Schoolbook is a highly legible typeface that is popular for many general purposes. This typeface was designed in this century using scientific research into typographic legibility. New Century Schoolbook has an *italic* and ***bold italic form***. It is a practical, sturdy typeface.

ITC Bookman ITC Bookman is a strongly styled, updated typeface. Although modified to improve legibility, ITC Bookman dates back to the hand-set print era. ITC Bookman is used for headlines and displays since they need a stronger style. **ITC Bookman has a demibold form that is somewhat playful** while the *light italic* and ***demibold italic*** forms are more elegant.

Zapf Chancery Medium Italic Dating from 1979, ITC Zapf Chancery Medium Italic is a graceful typeface that has the look of calligraphy. Designed by Hermann Zapf, this typeface is useful for invitations, announcements, and text that needs elaborate flourish. This typeface has but one form, the Medium Italic used here. However, PostScript allows many size changes and gives you some variation.

Symbol The Symbol typeface is used for technical and mathematical notation. It also contains Greek letters. ! ∇ # ∃ % & ∅ () * ∅ + - / A B X Δ E Φ Γ H I ∅ K Λ M N O Π Θ P Σ T Y ζ Ω Ξ Ψ Z ® © ™ γ ! α β χ δ ε φ

ITC Zapf Dingbats ITC Zapf Dingbats, also designed by Hermann Zapf, is a typeface of useful and whimsical characters with a wide variety of uses.



Chapter 6

Printer Care

Introduction	6-1
When to Replace the EP-L Cartridge	6-1
Removing the EP-L Cartridge	6-2
Installing the New EP-L Cartridge	6-5
The Cleaning Sheet	6-7
Breaking in a New EP-L Cartridge	6-8
Handling the Printer	6-9
Carrying the Printer	6-9
Keeping the Printer Clean	6-10

Introduction

In addition to using the correct paper and feeding it properly, the proper application of print onto paper requires that the EP-L toner application systems run smoothly. This chapter explains basic maintenance tasks to keep your printer running smoothly. It includes how to install an EP-L toner cartridge, how to produce a cleaning sheet, and how to handle the printer if you need to move it.

When to Replace the EP-L Cartridge

Usually, the EP-L cartridge lasts for approximately 3,500 prints (estimated for an average of 5% coverage on letter size paper). When the cartridge toner supply gets low, some parts of the page print lighter or don't print at all. You may sometimes increase the life of the EP-L cartridge by taking it out of the printer and redistributing the toner (fig. 6.4). Follow removal and installation instructions as normal, except re-install the existing cartridge after distributing the toner.

The EP-L cartridge contains the toner and laser-sensitive drum needed to operate the laser printer. The EP-L cartridge

- Is sensitive to light. Do not expose it to direct sunlight after opening
- Should be installed immediately after opening
- Should be kept level for storage. Do not stand or store the cartridge on its end.
- Contains a magnet. Keep the cartridge away from CRT's, disk drives, and floppy disks since possible damage to data stored in these devices may occur.

Additional EP-L cartridges may be purchased from your QMS vendor. See “Optional Accessories Available” appendix C of this manual.

Removing the EP-L Cartridge

To remove the EP-L cartridge

1. Remove any paper from the standard paper tray. Close the tray by pushing in the tray extension (fig. 6.1); then fold the tray up into the paper path door.

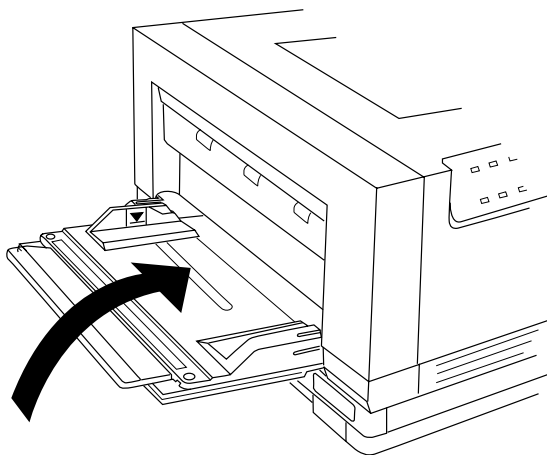


Fig. 6.1 *Closing the Standard Tray*

2. Pull up on the release button on the right side to open the paper path door (fig. 6.2).

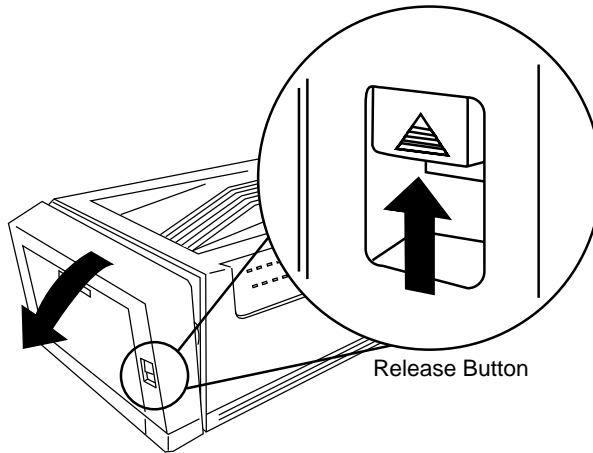


Fig. 6.2 *Open Paper Path Door*

3. Remove the EP-L cartridge by pulling on the center tab (fig. 6.3).

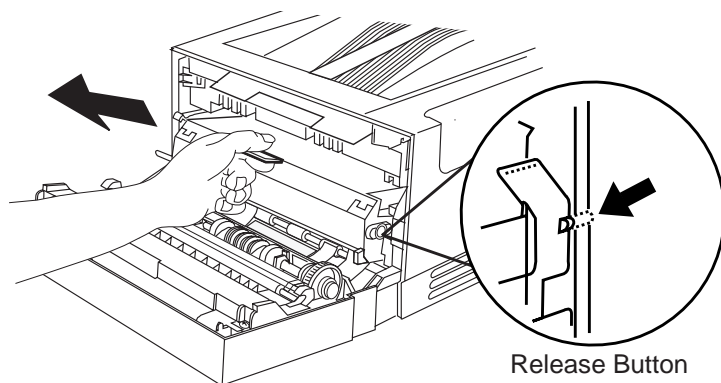


Fig. 6.3 *Remove EP-L Cartridge*

If the EP-L cartridge does not release easily, push the release button to the right of the inserted cartridge (fig. 6.3). Discard the used cartridge.

Installing the New EP-L Cartridge

Remove the new EP-L cartridge from the box and protective aluminum bag. Save the aluminum bag in case you need (at some time in the future) to remove a partially-used cartridge from the printer; storing a partially used cartridge in this bag protects it from light.

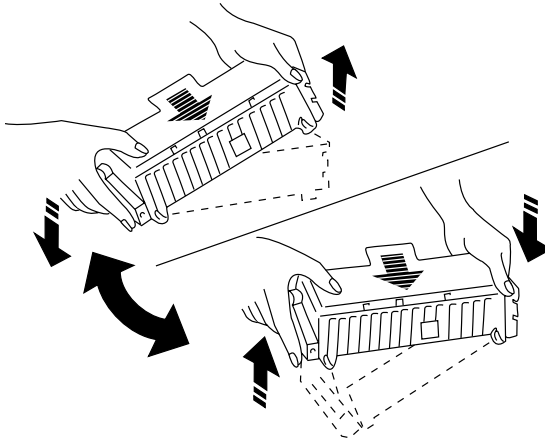


Fig. 6.4 *Distributing Toner in Cartridge*

1. Hold the cartridge as shown in figure 6.4 and gently rock it from side to side. This distributes toner inside the cartridge and helps ensure good quality printing.

2. Grasp the orange tab protruding from the side of the cartridge and flex it to break it loose. Pull the tab and the attached clear tape (18 inches/457.2 mm) completely out of the cartridge (fig. 6.5). Discard the tab and tape.

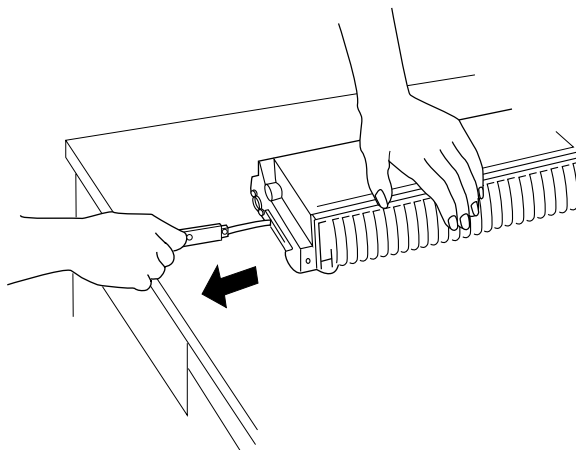


Fig. 6.5 *Removing the Toner Cartridge Seal*

3. Hold the cartridge so the green arrow points toward the printer. Line up the green arrow on the cartridge with the green arrow inside the printer (the cartridge should be angled down). Gently push the cartridge into the printer until it fits firmly (fig. 6.6). Close the paper path door.

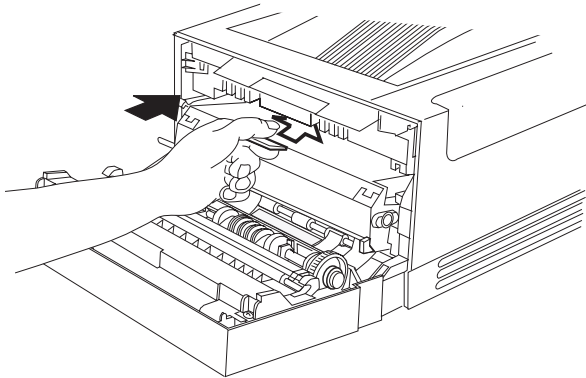


Fig. 6.6 *Inserting Cartridge into Printer*

The Cleaning Sheet

The cleaning sheet procedure must be used each time you install a new EP-L cartridge. To accomplish the cleaning procedure

1. Make sure there is paper in the standard tray.
2. If the Online indicator on the printer display panel is on, press the Online/Offline button to take the printer offline (the indicator light goes off).
3. Press the TEST/CANCEL button.

4. Press the Online/Offline button to put the printer back online. The printer produces a test configuration page and then a cleaning sheet.
5. Check the diagonal bar on the cleaning sheet. It should be solid black. If it is not, toner may be low or may need to be redistributed by gently rocking the toner cartridge from side to side (fig. 6.4).

The cleaning sheet procedure is now complete.

Breaking in a New EP-L Cartridge

A new EP-L cartridge may need some breaking in. If you have recently installed a new EP-L cartridge and your printed pages have faded areas, remove the cartridge and rotate it several times to loosen toner that may have settled. Then replace it and try printing again.

The output from a new cartridge is fine for plain text. However, if you are printing graphics or documents requiring the maximum toner density (for example, near camera-ready copy), use a cartridge that has been broken in by at least 50 copies.

If you print graphics or prepare near camera-ready art with your printer, consider buying extra EP-L cartridges. With extra cartridges on hand, you may break in a new one when you have a large print job not requiring maximum blackness. If your toner is low but still usable, store it, as level as possible, in the box. Be sure to follow the directions that come with each EP-L cartridge regarding storage conditions.

You now have a broken in EP-L cartridge ready to use. Unless stored more than a few weeks, the cartridge can be quickly rotated

and inserted into the printer when needed. If you break in a cartridge and then store it longer than a few weeks, you may want to run a several copies to refresh the toner.

Handling the Printer

Handle your printer with care to extend its life. Abuse may cause damage.

1. Do not place anything on the top of the printer.
2. Place only print media (paper or transparencies) in the standard tray.
3. Keep the output tray at minimum levels. If paper stacks too high, you may experience trouble with paper jams and excessive curl.
4. If you are not going to use the printer for an extended period of time
 - Unplug the power cord from the power source outlet.
 - Leave the EP-L cartridge inside the printer.
 - Close the standard tray.

Carrying the Printer

When carrying the printer from one place to another, remove the EP-L cartridge from the printer. Store the partially used cartridge in the protective aluminum bag in which it was originally packaged. If you do not have this bag, wrap the EP-L cartridge in a piece of dark, heavy cloth.

When carrying the printer, be sure to close the standard tray and to grasp the printer firmly at the bottom with both hands. Do not lift the printer by the output tray slot nor the interface connector area.

Keeping the Printer Clean

The QMS-PS 410 printer requires a minimum of cleaning. However, at times it may be necessary to clean the inside or outside of your printer. To maintain the appearance of your printer

- Remove the printer's power cord from the power outlet before cleaning or an injury may result.
- Do not use sharp objects to clean the printer.
- Do not use cleaning solutions to clean the inside of your printer. To prevent printer damage, use only a dry, lint-free cloth.

1. Look inside the printer by opening the paper path door. Spots where toner may collect are shown in figure 6.7.

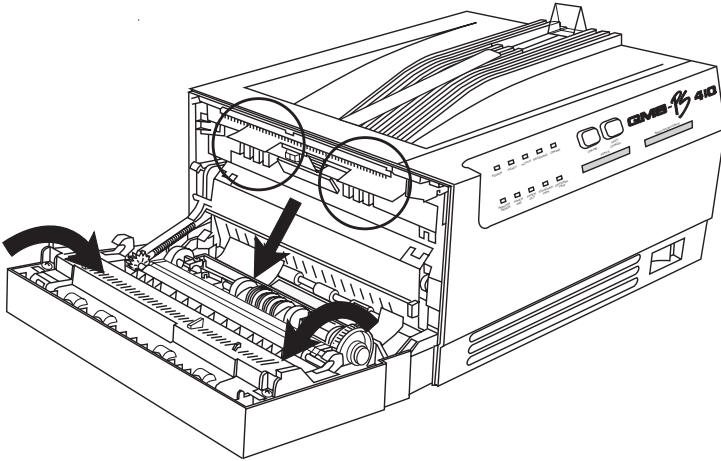


Fig. 6.7 *Possible Toner Locations*

Wipe away any visible toner with a dry lint-free cloth. Do not remove the EP-L cartridge and be careful not to bend any of the mylar paper guides (circled in fig. 6.7).

2. Use water or an alcohol-based cleaning solution to clean the outside of your printer. Test the cleaner on a small area of your printer to check its performance. Never spray solutions directly onto the printer. Always spray cleaning solution onto a cloth, and then wipe your printer with it.

Chapter 7

Troubleshooting Printer Problems

Introduction	7-1
Active Light	7-3
Power Light	7-4
Printer Error	7-4
Preventing Jams	7-5
Clearing a Paper Jam	7-6
Printer Resets	7-14
Blank Pages	7-14
Not All Pages Are Printed	7-15
Unclear Printout	7-15
Printer Ejects Blank Pages	7-15
IBM PC/Compatible Users - Check the Following:.....	7-16
Macintosh Users - Check the Following:	7-16
Paper Jam Indicator Stays On	7-17
General Print Quality Problems	7-17
A Quick Check	7-17
Specific Print Quality Problems.....	7-18
White or Light Lines	7-18
Light Image (entire page)	7-18
Dark Image (entire page).....	7-19
Black Image (entire page).....	7-19
Smudge Along Right Edge of Page	7-19
Smudges on Back of Page.....	7-19
Dark Vertical Lines	7-20
Sharp Horizontal Black Lines (across feed direction)	7-20
Blurred Horizontal Stripes	7-20
White Horizontal Shapes on a Black Print	7-20
White Vertical Lines on a Black Page	7-20
Image Easily Smears When Rubbed.....	7-21
Placing a Service Call	7-21

Introduction

In the world of computers and printers, occasionally problems can develop over the smallest of details. Printing problems usually stem from one of three areas:

- Application software
- Computer hardware
- Printer hardware

This section contains a list of possible printer problems and solutions. If you have just installed your printer, be sure you have followed the steps outlined in the *Getting Started Guide*.

Follow the steps below to identify the source of your problem and to learn about possible solutions. Many problems can be corrected by going through the steps on this list.

1. Does the printer power light come on?

YES - Go to number 2.

NO - Check the following:

- Is the power cord plugged into both the power outlet and the printer?
- Is the printer's power switch in the **ON** position (1)?
- Is the power outlet working?
- Does the line voltage from the power outlet match the printer's power requirements? See appendix B, "Technical Specifications."

2. Can you print a test configuration page using the following procedure?
 - a. If the Online indicator light is on, press the Online/Offline button to take the printer offline.
 - b. Press the Test/Cancel button.
 - c. Press the Online/Offline button to put the printer back online.

In a few seconds, two pages print. The first page is the test configuration page (the second is the cleaning sheet.) This test page gives a complete report on the printer's current status.

YES - Go to question 3.

NO - Check the following:

- Is the printer offline before you try to perform a self test? It should be.
 - Does the standard tray have paper? If out of paper, the Paper Out indicator should be lit.
 - Is the method of tray delivery configured correctly? See chapter 4, "Printer Use."
 - Is the printer paper path door closed securely?
 - Is there a paper jam? The Paper Jam indicator should be lit. Go to the section called "Clearing a Paper Jam" later in this chapter.
3. Is the printer receiving data from the computer? Check the status of the Receiving indicator. If it blinks after sending the file, the printer is receiving the data. If it is not
 - Is the online indicator on the display panel on?

- Is the interface configuration on your host correct? See the *Getting Started Guide* or chapter 8, “Printer/Host Communication.”
 - Print a test configuration page from the display panel. If you are using the serial interface, is the baud rate (speed of data transmission) of the printer, the computer and your software application program the same? See chapter 8 “Printer/Host Communication.”
 - If you still cannot identify the problem, contact your QMS vendor.
4. Is the printer printing garbage output or not printing at all when in ESP mode?
- Reconfigure the port to which you want to print to the specific printer language of the file you are trying to print. See chapter 3, “Selecting Printer Languages” for instructions or use the PS Executive Series Utilities to change emulations.
 - If a PostScript file prints straight code while in ESP mode, increase the emulation timeout with the PS Executive Series Utilities.
 - If you continue to have problems with the ESP mode selecting printer language, contact your QMS vendor.

Active Light

After warming up, if the Active indicator stays on, two problems may exist. If you are downloading additional typefaces, too many can overload the printer’s memory causing the printer to reset. If

this is not your case, you may have a laser or engine failure, and you should place a service call to your QMS vendor.

Power Light

If the Active indicator is on, but no start-up page prints, turn off the printer and check the following:

1. From a cold start, it takes a minute for the printer to warm up. Be sure you have waited long enough for a start-up page before suspecting a problem.
2. Check that there is paper in the paper tray.
3. Close the multi-purpose tray. Open the side of the printer and check for a paper jam. If a jam is present, go to the section called “Clearing a Paper Jam” later in this chapter.
4. Make sure a toner cartridge is installed.
5. Check to see if you have disabled the start-up page with the PS Executive Series Utilities program. Go into the program and enable the start-up page or try sending a file you know prints.
6. If none of the above problems are found, call your QMS vendor.

Printer Error

If the Printer Error light comes on

1. Make sure a toner cartridge is installed in the printer.
2. Power the printer off and back on.

3. Press the Test/Cancel and Online/Offline buttons at the same time and hold them down.
4. Turn the printer back on and release the Test/Cancel and Online/Offline when the Online indicator comes on.

If upon powering up, the printer error light is still on, contact your QMS vendor.

NOTE: Pressing both the Test/Cancel button and the On-line/Offline button restores the printer to its factory defaults.

Preventing Jams

There are several things you can do to either eliminate or drastically reduce the number of paper jams occurring.

- The printer must always be placed on a level surface.
- Your paper, envelopes, labels, and overhead transparencies must meet the guidelines set for the printer in appendix B, “Technical Specifications.”

If you have problems with double feeding, remove the paper from the tray and fan the edges. The sheets may be sticking together.

- Print media must be stored away from moisture and humidity.
- Many manufacturers place an arrow on the end of the wrap around the paper that indicates which side should be used for printing. If you have problems and cannot determine which side of the paper should be printed, remove the paper

from the input tray, rotate the stack a half-turn, turn the stack over, and then place it back in the tray.

- The printer's paper path may be dirty; produce a cleaning sheet as outlined in chapter 2, "Printer Use."
- Adjust the paper stop in the output tray to the correct length of paper you are using.
- If none of the above relieves repeated paper jamming, notify your QMS vendor.

Clearing a Paper Jam

When a paper jam occurs, the Paper Jam indicator on the printer's display panel lights. Frequent jams in any area indicate that area should be checked and repaired or cleaned. Repeated jams may also signal you are using the wrong weight paper.

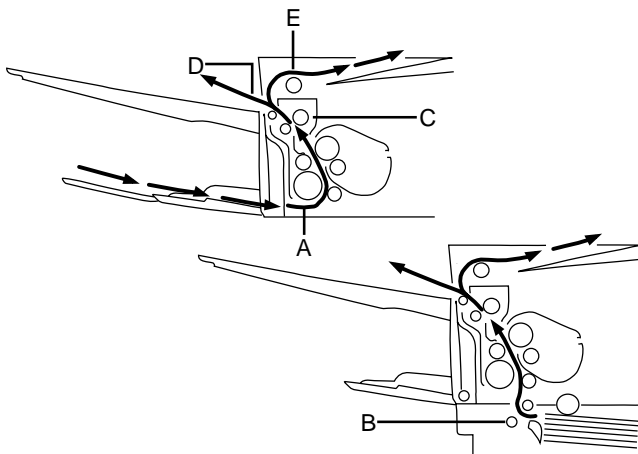


Fig. 7.1 *Paper Jam Locations*

Paper jams occur typically around the fuser roller assembly (A), and the paper feed area (B). See figure 7.1.

Clear paper jams as follows:

1. Close the standard tray if it is open. (If the face-up tray is installed, remove it.)
2. Pull up the release button on the side of the front cover to unlatch the paper path door (fig. 7.2). Open the door. **Be careful; the area around the transfer guide and roller is hot.**

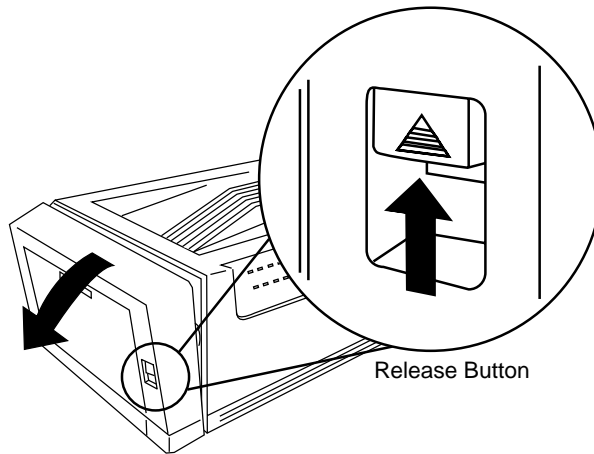


Fig. 7.2 *Open Paper Path Door*

3. If you are printing from the standard tray, first check the paper feed area. If there is a jam, remove the paper by pulling it in the direction of the arrow (fig. 7.3).

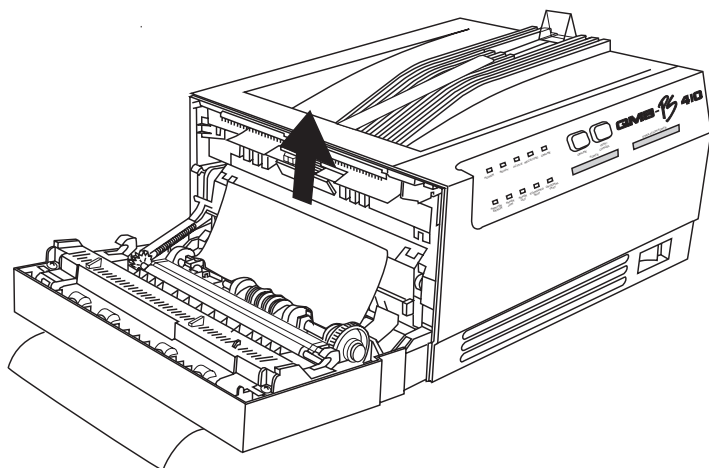


Fig. 7.3 *Remove Paper from Paper Feed Area*

4. If you are printing from the optional paper tray, pull out the tray and check the paper feed area (fig. 7.4). Remove paper by pulling straight out of the printer.

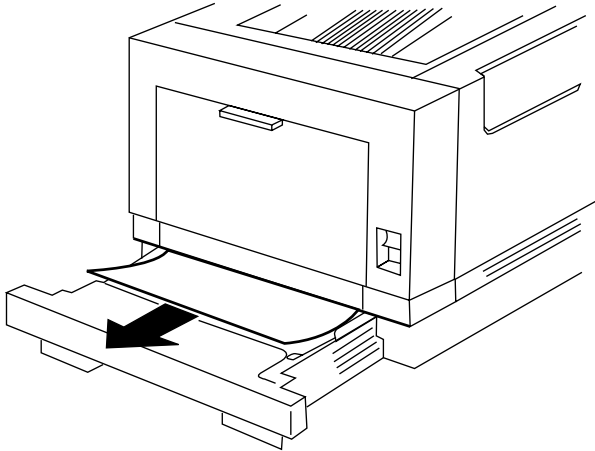


Fig. 7.4 *Remove Paper from Paper Feed Area*

5. Check the fixing assembly area. If paper is jammed here, pull back toward printer to remove it.

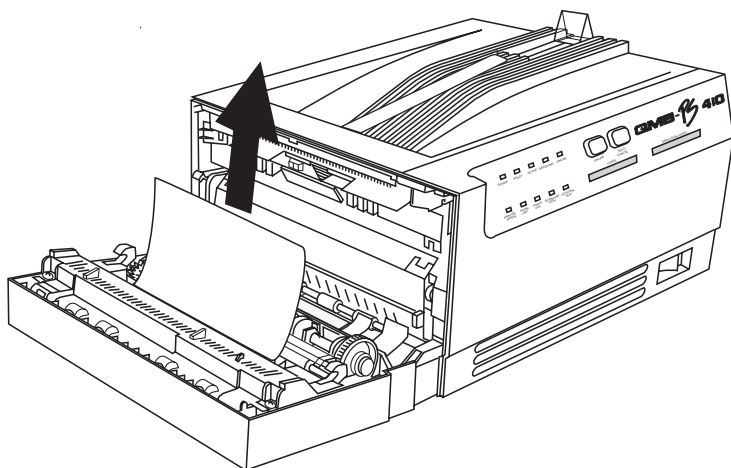


Fig. 7.5 *Remove Paper from Fixing Assembly Area*

6. If any paper extends from the side of the fixing assembly area, pull sheet(s) in the direction of the arrow.

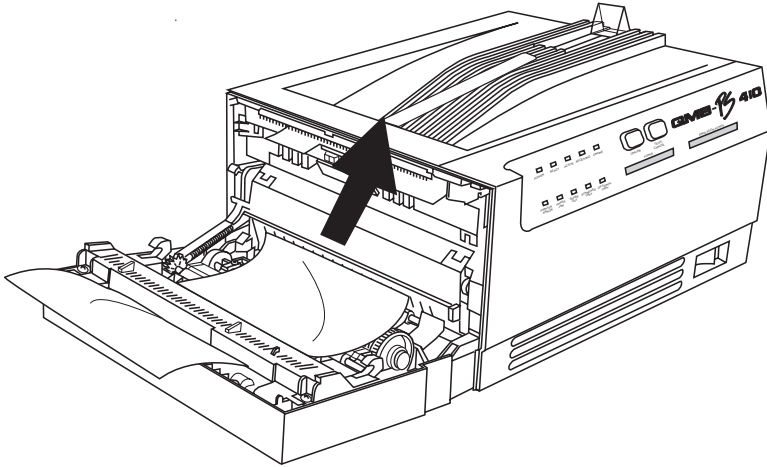


Fig. 7.6 *Remove Paper from Fixing Assembly Area*

NOTE: Pulling paper in the opposite direction of the arrows may cause toner to adhere to the inside of the printer. This toner may stain subsequent prints. Also, avoid touching the paper as much as possible since the toner is not completely fixed at this area and may smudge on your hands or clothing.

7. If the end of the paper has completely passed through the fixing assembly, pull the paper in the direction of the arrow (away from printer).

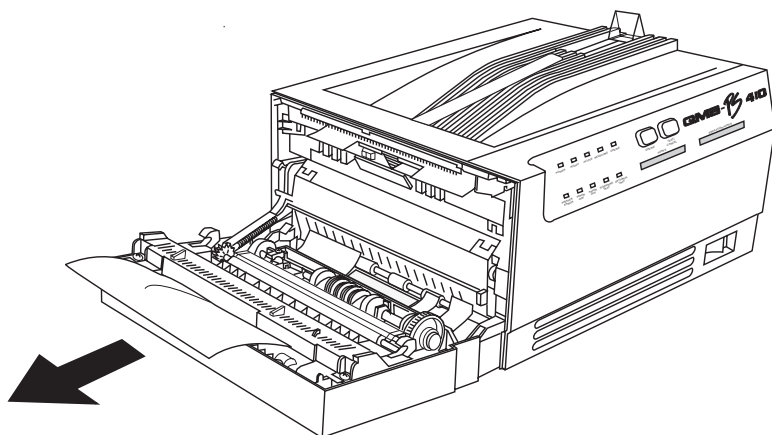


Fig. 7.7 *Remove Paper from Fixing Assembly Area*

8. Check the face-up print delivery area. If paper jams in this area, open the access door and pull the paper straight up.

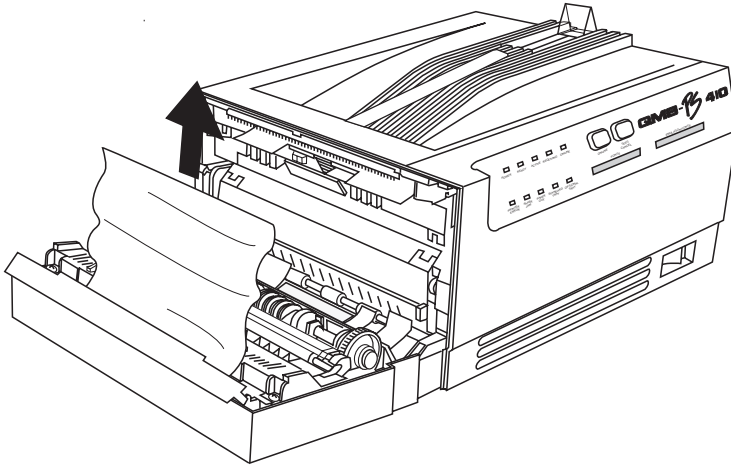


Fig. 7.8 *Clearing Jams from Fuser Access Door*

9. After checking and removing jams from the areas indicated above, close the paper path door. If all the jam has been removed, printing restarts when the cover is closed. If printing does not restart, or the printer jams again, make sure that no pieces of paper remain in the printer.

Printer Resets

If the printer resets or reboots itself, check for the following problems:

1. Macintosh applications have a setup file (LaserPrep) which the LaserWriter program sends to the printer at the beginning of the first job printed by a Macintosh. This file sets the state of the printer for use by the Macintosh. Each Macintosh on the network must send the same version of setup file or the network experiences re-initialization. Re-install the same version of the LaserWriter and the Laser Prep file into the System Folder on each networked Macintosh if you experience problems.
2. If you are downloading additional typefaces, too many can overload the printer's memory causing the printer to reset to default.
3. If the printer resets in other circumstances, call your QMS vendor for service.

Blank Pages

If the printer prints blank pages, check for the following possible problems:

1. If the start-up page ejects but is blank or blank pages output from the printer during a printing job, check the EP-L toner cartridge. Pages do not print if the toner cartridge is out of toner.
2. Be sure you broke the tab on the side of the EP-L cartridge and removed the sealing tape.
3. If the toner cartridge is not empty and the sealing tape is removed, and blank pages are being ejected, take the toner

cartridge out and roll it from side to side. This procedure is described in chapter 2, “Printer Use,” as well as in the directions that come with the cartridge.

4. If these solutions do not work, contact your QMS vendor.

Not All Pages Are Printed

1. Check your cable. See the section in the *Getting Started Guide* on connecting and testing with either a Macintosh or an IBM PC. You may have the wrong kind of cable.

Unclear Printout

See “Print Quality Problems” at the end of this chapter.

Printer Ejects Blank Pages

1. Check the Active indicator. If the light is on, try sending your file to the printer again, and if the Active indicator does not light, check the interface setting. You may not be configured for the correct cable and port. See the “Connecting the IBM PC” or “Connecting the Macintosh” in the *Getting Started Guide*.
2. There may be a problem with the connection of devices. Review the section entitled “Connecting the Printer to the Host” in the *Getting Started Guide* to be sure you have properly connected to the printer. You must have the right kind of cable: null modem serial or parallel for IBM PC or compatible users, and LocalTalk for Macintosh or networked users. See Appendix A. These cables may be ordered from your QMS vendor.

IBM PC/Compatible Users - Check the Following:

- Is the printer turned on?
- If you are communicating serially, does your software setup match the serial settings that appear on the lower half of the test configuration page?
- Have you set up your printer port on the system level (DOS) and installed a PostScript driver within your application program? (See DOS and software documentation.)
- Check the manual that came with your software program to ascertain whether the program is PostScript compatible.
- For users of the RS-232C serial port: from the DOS screen, type the mode commands to activate the serial port. Change to either ESP mode or HP PCL emulation through the PS Executive Series or by sending *5 setsoftwareiomode*. Send a simple Print Screen by pressing the Print Screen key on the keyboard. If this produces a page it tells you that your serial port, cable, and the printer are working.
- If you get a printout, then your application program is configured incorrectly. Make sure you have installed the correct printer driver and have told the software what port you plan to use.

Macintosh Users - Check the Following:

- Is the printer turned on?
- Are the printer and computer properly connected?
- Has the LocalTalk port been mistakenly configured for an emulation other than PostScript mode? It should not be

changed. Use the PS Executive Series Program to reset it or reset the printer to its defaults by pressing both the Test/Cancel and Online/Offline button simultaneously.

- Are LaserWriter and Laser Prep files installed in your System Folder and the same version?
- Have you selected LaserWriter in the Chooser and highlighted the printer name?
- Is AppleTalk active?
- Is the LocalTalk cabling properly terminated?

Paper Jam Indicator Stays On

If the Paper Jam indicator lights, open the printer and clear the jam. See the previous section, “Clearing a Paper Jam,” for more information.

General Print Quality Problems

Print quality problems are those related to the appearance of the pages you have printed. These include white lines, uneven blacks, and other print distortions.

If you are having problems with print quality try the procedure that follows.

A Quick Check

- Check the print density dial inside the printer. Change the setting and try printing.

- Remove the EP-L cartridge and rotate it several times. Toner can settle; this procedure redistributes it. Insert the cartridge and try printing again.
- Place a service call to your QMS vendor.

Specific Print Quality Problems

Listed below are several print quality problems with possible solutions. Try the solutions in the sequence given. If these do not solve the problem, place a service call.

White or Light Lines

1. Remove the toner cartridge and rotate it as you do before installing a new cartridge. This redistributes toner inside the cartridge.
2. Install a new toner cartridge.

Light Image (entire page)

1. Increase print density by using the print density adjustment dial inside the printer.
2. Remove the toner cartridge and rotate it as you would when installing a new cartridge. This redistributes toner inside the cartridge.
3. Replace the toner cartridge.

Dark Image (entire page)

1. Decrease the print density by turning the print density dial inside the printer to a higher number.
2. Remove the toner cartridge and rotate it as you would when installing a new cartridge. This redistributes toner inside the cartridge.
3. Install a new toner cartridge; the old one may be defective, releasing too much toner.

Black Image (entire page)

1. Install a new toner cartridge.
2. Contact your QMS vendor.

Smudge Along Right Edge of Page

1. Install a new toner cartridge.

Smudges on Back of Page

1. Produce a cleaning sheet from the buttons on the display panel. The paper path may be dirty.
2. Toner may have escaped into the printer. See “Keeping Your Printer Clean” earlier in this chapter.
3. The EP-L cartridge may be damaged. It may need to be replaced.

Dark Vertical Lines

1. Install a new EP-L cartridge.

Sharp Horizontal Black Lines (across feed direction)

1. Place a service call.

Blurred Horizontal Stripes

1. Remove the toner cartridge and rotate it as you do before installing a new cartridge. This redistributes the toner inside the cartridge.
2. Install a new toner cartridge.

White Horizontal Shapes on a Black Print

1. Replace the paper in the printer with dry paper.
2. If you are using transparencies, remember they should be the type recommended in chapter 2, “Printer Use.”

White Vertical Lines on a Black Page

1. Remove the EP-L cartridge and rotate it as you would when installing a new cartridge. This redistributes toner inside the cartridge.
2. Make sure your software and printer settings match. If you are printing an HP file in either an HP or ESP mode and you get a pattern of white lines, then the problem is most likely a mismatch of parity settings.

Image Easily Smears When Rubbed

1. Place a service call.

Placing a Service Call

If you have a problem you can't resolve, **always contact your QMS vendor first**. Your QMS vendor is best equipped to immediately handle any problem you may encounter. Be prepared to provide a complete description of the problem, a start-up page, and sample printouts if available.

If you call for assistance, have answers ready for the following questions to help the technicians serve you more quickly.

1. What printer model are you using?
2. What kind of host computer are you using?
3. What operating system and version are you using?
4. What interface are you using? If serial, what protocol?
5. What software are you using?
6. What emulation are you using?
7. What is your firmware version?

If you have technical questions your vendor can't answer, call QMS's Customer Technical Service at 205-633-4500. (International vendors are listed in appendix F, "Product Sales and Support.")

Chapter 8

Printer/Host Communication

Introduction	8-1
About Serial Communication	8-1
Channel	8-1
Baud Rate	8-2
Option	8-2
More About Flow Control for Serial Users	8-5
Changing the Default Parameters	8-6
Channel (Interface)	8-7
Baud Rate	8-7
Parity and Protocol	8-7
Testing Communication: Sample Files	8-9
Sample Edlin Files	8-10
Sample PostScript File	8-12
The Error Handler	8-13

Introduction

This chapter provides more advanced information on your printer and your host's communication with the printer. The simplest way to change your printer's method of communicating is to use the PS Executive Series Utilities software included in your purchase. The following tasks may be accomplished, however, without the print utilities. This chapter explains how to perform these tasks. Topics discussed in this chapter are

- Flow control protocols
- Sample files to test communication
- Modes of operation

This chapter is primarily designed for more advanced users in the IBM PC and DOS environments.

About Serial Communication

Three parameters determine the details of serial communication: channel, baud rate, and options.

Channel

The channel is the 25-pin serial connector on the printer. PostScript identifies that channel with the integer, 25.

Baud Rate

The baud rate is a measure of the speed of information or data transfer. The baud rate is a number, such as 1200, 2400, or 9600. The baud rates that this printer is capable of handling are

300
600
1200
2400
4800
9600
19200

Table 8.1 *Baud Rates*

For most users, 1200, 9600, or 19200 (depending on the system) is used. 9600 is the factory default for baud rate.

Option

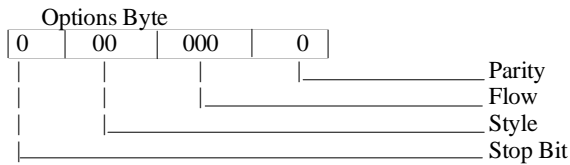
The option defines flow control and parity parameters. Flow control (also known as handshaking or protocol) is a software technique used to control the flow of information between the host computer, the software application program, and the printer.

The parity and protocol option is specified by an integer in the range 0 to 255. This integer represents a byte whose eight bits specify the number of stop bits, style, flow control and parity.

- Stop bits indicates the number of stop bits transmitted per character.
- Style indicates whether 7 data bits or 8 data bits are used.

- Flow control indicates the protocol used.
- Parity indicates either ignored, odd, even, or none is being used.

The eight bits of the option byte are assigned as



Stop Bit	Style	Flow	Parity
0 - - 1 Stop Bit	0 - - 7 Bit Data	0 - XON/XOFF/DTR	0 - - - Ignored
1 - - 2 Stop Bit	1 - - 7 Bit Data	1 - DTR	1 - - - Odd
	2 - - 8 Bit Data	2 - ETX/ACK	2 - - - Even
	3 - - Undefined	3 - UNDEFINED	3 - - - None
		4 - UNDEFINED	
		5 - XON/XOFF BI DIR	
		6 - UNDEFINED	
		7 - UNDEFINED	

Table 8.2 *Option Byte Assignments*

The most commonly used option integers for 7-bit data are

Option No.	Parity	Flow Control
0	Ignored	XON/XOFF
1	Odd	XON/XOFF
2	Even	XON/XOFF
3	None	XON/XOFF
4	Ignored	DTR/DSR
5	Odd	DTR/DSR
6	Even	DTR/DSR
7	None	DTR/DSR
20	Ignored	XON/XOFF BI DIR
21	Odd	XON/XOFF BI DIR
22	Even	XON/XOFF BI DIR
23	None	XON/XOFF BI DIR

Table 8.3 7 Bit Data

The most commonly used option integers for 8-bit data are

Option No.	Parity	Flow Control
64	Ignored	XON/XOFF
65	Odd	XON/XOFF
66	Even	XON/XOFF
67	None	XON/XOFF
68	Ignored	DTR/DSR
69	Odd	DTR/DSR
70	Even	DTR/DSR
71	None	DTR/DSR (Factory Default)
84	Ignored	XON/XOFF BI DIR
85	Odd	XON/XOFF BI DIR
86	Even	XON/XOFF BI DIR
87	None	XON/XOFF BI DIR

Table 8.4 8 Bit Data

More About Flow Control for Serial Users

Desktop publishing programs often use DTR/DSR, while a spreadsheet program in the HP emulation may use XON/XOFF. If you are using a serial interface (RS-232C) between your host and the printer, you may experience printing problems because your software application program and your printer are using different flow controls. The problem is usually noticed when sending long documents to the printer. The first few pages are fine, then the printer begins to print erratically or not at all. If this happens, you must change the printer's flow control setting. This may be done two ways: either with the PS Executive Series Utilities, or manually, by sending the necessary PostScript commands to the printer.

The printer's test configuration page (see chapter 2, "Printer Use") indicates the flow control protocol used by the printer at power up. All the default settings communicate DTR/DSR. If there is no statement of software protocol listed on the test configuration page, you are still using the default DTR/DSR flow control protocol. If flow control has been changed from the default, XON/XOFF shows.

It can be more difficult to find out what flow control protocol your software application program uses. Some application programs are helpful and contain menu items allowing you to select your flow control protocol. If so, make sure you select the same one used by the printer. Check the printer test configuration page and choose accordingly.

NOTE: Most PC applications use DTR/DSR protocol.

However, many application programs do not allow you access to flow control protocol through their program. If you cannot determine the protocol through the program itself, check the

program's documentation. The manual may say which flow control protocol the program uses to print. If you can not find this information, try sending a long document to the printer. A flow control conflict is usually indicated by erratic printing: several pages print but not the complete file. If you experience erratic printing, switch your flow control protocol.

Changing flow control protocol, however, requires some technical knowledge and may take some time. The following sections explain how this is done in a general way. The specific commands may vary according to what software application programs you use.

Changing the Default Parameters

The normal default parameters for the serial interface are

- DTR/DSR software flow control protocol
- Parity none
- 9600 baud
- 8 data bits
- 1 stop bit

If any of these defaults are incompatible with your system, you can change them. The defaults for parity, baud rate, data bits and stop bits for the serial interface may be changed in two ways. The first, and easiest, is with the PS Executive Series Utilities Program. You may also use the PostScript command, *setsccbatch*, with integers that identify the parameters. For example

integer(channel) integer(baud) integer(option) *setsccbatch*

For example, a command might look like this:

25 19200 67 setscbatch

Channel (Interface)

The interface must be

- 25 (for 25-pin cable serial port)

Baud Rate

The baud rate must be chosen from Table 8.1. For example

- 9600

Parity and Protocol

We recommend choosing the parity and protocol from Table 8.3. For example, to change from the default DTR/DSR, choosing option number 67 from the table results in

- Parity = None
- Protocol = XON/XOFF

To send the *sccbatch* command to change parameters, you must

1. Make a file. Using a text editor allows you to make sure the commands are typed correctly. Popular text editors are DOS Edlin, WordStar (non-document mode), PC-Write, SideKick, or most of the professional word-processing packages. Any text editor or package which outputs a plain ASCII text file will do.
2. Type into this file the correct PostScript commands to change the default settings of the PostScript mode. This command can change the channel, the baud rate, and parity. The following PostScript commands change the default parameters of the 25-pin RS-232C channel interface to a baud rate of 19200, parity none, XON/XOFF flow control. You must type the command exactly as follows.

```
C:\>edlin filename
New file
*i
  1:*serverdict begin Ø exitserver
  2:*statusdict begin
  3:*25 19200 67 setsccbatch
  4:*showpage
  5:* ^D
  6:* ^Z
*ex
C:\>print filename
```

NOTE: PostScript is case sensitive. The commands must be entered exactly as shown above or the file will not work.

3. Send the file to the printer. Use either the text editor's printing commands or, on the DOS level, the *copy* or *print* (C:> print *filename*) command. (Remember, you must be either in the PostScript or ESP mode for the above command to work.)
4. Re-boot your system and turn the printer off, then back on.


If a blank page ejects from your printer, the file has been transmitted successfully. The changes you have made to the printer are now the default settings.

Testing Communication: Sample Files

Try the following sample files to test your computer and printer setup. You must be in either ESP or PostScript mode for the following files to work. Using a text editor allows you to make sure the commands are typed correctly. Popular text editors are DOS Edlin, WordStar (non-document mode), PC-Write, SideKick, or most of the professional word-processing packages. Any editor which outputs a plain ASCII text file will do.

Sample Edlin Files

If you have an IBM PC/compatible and use the Edlin editing system, you may use the following sample files to test your laser printer and PC connection. Filename should be substituted with whatever name you chose for your file. ^D (hold down the control key while pressing D) and ^Z (hold down the control key while pressing Z) are end-of-file signals. The *print filename* sends the file to the printer.



```
C:\>Edlin filename
New file
*i
  1:*showpage
  2:* ^D
  3:* ^Z
*ex
C:\>print filename
```

The *showpage* command in the previous file is the PostScript command for a form feed. If you typed this file correctly, a blank page prints.

Send this file to select a font with PostScript:

```
C:\>edlin filename
New file
*i
  1:*/Times-Roman findfont 30 scalefont setfont
  2:*144 432 moveto
  3:*(Your Name) show
  4:*showpage
  5:* ^ D
  6:* ^ Z
*ex
C:\>print filename
```

NOTE: The parentheses around your name must be included.

If you typed the previous file correctly, your name prints in Times-Roman beginning two inches from the left of the page and 6 inches from the bottom of the page.

Sample PostScript File

To sample PostScript's versatility, type the following in a file, using a text editor, exactly as it appears (with your name in the places marked with italicized text). Any mistake results in an error and no output is delivered.

Remember, you must first make a file in the text editor you are using and then send the file to the printer.

```
/inch {72 mul} def
/Helvetica-Bold findfont 30 scalefont setfont
/outline
{true charpath stroke} def
/namecir
{15 15 345
{gsave
rotate 0 0 moveto
(Your name here) outline
grestore
} for}def
4.25 inch 5.75 inch translate
.5 setlinewidth
namecir
0 0 moveto
(Your name here) true charpath
gsave 1 setgray fill grestore
stroke
showpage
```


The Error Handler

A handy diagnostic tool for a file, or portion of a file, that won't print is the Error Handler. Whenever the printer encounters an error while in PostScript mode, it prints a page identifying the error. The file must be sent to the printer after each power cycle. The Error Handler file in the PS Executive Utilities program included with your QMS-PS printer. Follow the instructions in the utilities manual.

Chapter 9

PostScript: Technical Overview

Introduction	9-1
How Your Printer Works	9-1
Using PostScript: Interactive Mode	9-3
Entering Interactive Mode	9-3
Exiting Interactive Mode	9-5
Editing Keys	9-5
Changing the Default Paper Cassette	9-6
Switching Cassettes (Tray chaining)	9-7
The PostScript manualfeed Operator	9-8
Manual Feed Within Your Program	9-9
Changing Default manualfeed	9-10
About Timeouts	9-11
Auto Select and Emulation Timeouts	9-12
Manual Feed Notes	9-12

Introduction

PostScript is a programming language that provides extensive graphics capabilities. PostScript describes appearance of text, geometric shapes, and sampled images of a page to the printer and thus is called a page description language. It can rotate, scale, clip, and orient all graphic objects on all or part of a page.

PostScript is designed to work with raster-output devices. These devices include laser, dot-matrix, and ink-jet printers, as well as raster-scan displays. A raster device prints or displays images consisting of individual dots or pixels (picture elements). On most black-and-white output devices, each pixel can be made either black or white; on some devices, each pixel can be set to an intermediate shade of gray or some color. A page to be printed can be described simply as an array of pixel values. It describes the appearance of the entire page, both text and graphics, in abstract graphical terms rather than in terms of pixels.

How Your Printer Works

The printer is composed of two major parts: the engine and the controller.

The engine is the main body of the printer where the pages are physically printed. The controller is the part of the printer which houses the PostScript software where data is processed for printing.

Information sent to the printer is scanned by the PostScript software and then processed into a bit-mapped image which is formatted and stored in page memory. Printing consists of reading the image information from page memory, serializing it, and outputting the information on a printed page.

Once in the printer, the data is used to modulate a tightly-focused beam of light produced by a laser. The laser beam is directed to a rotating, hexagonal mirror which causes the beam to scan across a photosensitive print drum. Each scan results in a raster line on the print drum. The raster lines are transferred from the print drum to the paper by electrostatic attraction and heated-roller fusion. The result is a high-quality, smudge-proof image on standard copier paper.

A typical PostScript document has two parts: a prologue and a script. The prologue contains definitions that match output functions of the application program used. The script contains the program the user wants to print.

The resident typefaces contained in the printer can be scaled to any size, limited only by software and hardware considerations. Post-Script retains the outlines, or relational blueprints, for the resident typeface. There is a great variety of software supporting Post-Script.

Additional information on PostScript is available in chapter 10, “PostScript: Operator Dictionary.” More information on PostScript may be found in three books: *The PostScript Language Reference Manual*, *The PostScript Language Tutorial and Cookbook*, and *PostScript: Language Program Design*, all published by Addison-Wesley.

Using PostScript: Interactive Mode

PostScript programs are usually generated by application programs such as word processors. However, PostScript is available for direct use. In interactive mode, the printer and PostScript function like a computer. You input a command and this command is carried out. Then another command is input. The user speaks directly to the interpreter.

In addition to documenting the use of interactive mode, this chapter gives a short procedure for changing the persistent parameters of the printer. Only advanced users or those with equivalent knowledge should attempt to use interactive mode. It is not for beginners. You could damage your printer if it is used incorrectly. Most of the functions covered in this chapter may be accomplished through the PS Executive Series Utilities program received with the printer.

NOTE: Only those familiar with the PostScript language or those with similar programming experience should attempt to work in interactive mode.

Entering Interactive Mode

The following information is for IBM PC/compatible users. The first step in using the interactive mode is selecting the serial interface for communication. PostScript does not echo back to your monitor unless you are in serial communication. Additionally, the serial port must be in the PostScript-only mode. Interactive mode does not work with ESP mode.

1. First, make sure your printer is connected with an RS-232C null modem serial interface and configure your COM1 port in your AUTOEXEC.BAT file for the correct protocol, baud rate, and other options using a mode statement.

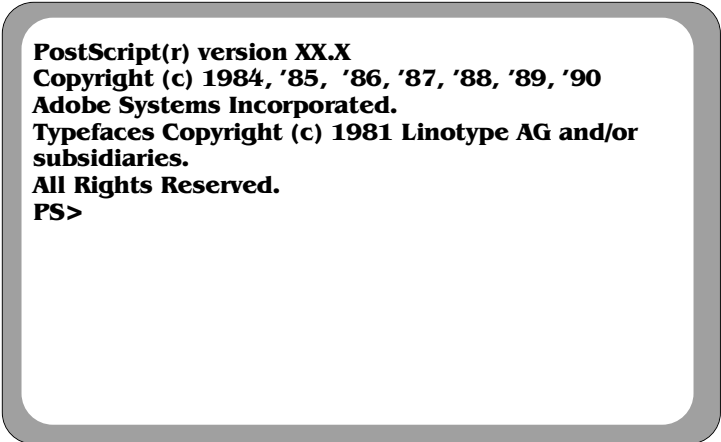
2. Put the printer in PostScript-only mode using the PS Executive Series Utilities.
3. Enter your communication program enabling you to talk directly to the printer.

NOTE: Most PostScript commands are in lower case and should be typed in lower case with few exceptions (i.e., font names with capital letters). Since PostScript is case-sensitive, you must type commands exactly as they appear.

4. Type the following, in lower case letters:

executive

Press the Return or Enter key. The word *executive* does not appear on the screen, so type carefully. The following prompt should appear:



PostScript(r) version XX.X
Copyright (c) 1984, '85, '86, '87, '88, '89, '90
Adobe Systems Incorporated.
Typefaces Copyright (c) 1981 Linotype AG and/or
subsidiaries.
All Rights Reserved.
PS>

NOTE: The commands that you type do not appear on the screen, so type carefully. **If you make a mistake when typing, the command does not work.** If you make a mistake, use the editing keys or exit the interactive mode and start at the beginning of the procedure.

Exiting Interactive Mode

To end interactive mode

1. Type

Ctrl + D

(Hold down the Control key while pressing D.)
This inserts the serial end-of-the-file character.

2. If you want to return to ESP mode, quit you application and return the printer to ESP mode using the PS Executive Series Utilities.

Editing Keys

The following special characters can be used to make corrections when entering a command as long as the Return key has not yet been pressed.

<i>Interactive Mode Editing Keys</i>	Backspace	backs up and erases one character
	Ctrl + H	backs up and erases one character
	Ctrl + U	erases the current line
	Ctrl + C	aborts the entire statement and starts over
	Delete	same as a Backspace key

Changing the Default Paper Cassette

The paper source default setting is automatic feed from the standard tray. If you wish to change the default so paper feeds from the lower optional cassette, you have two choices. The easiest way is to use the PS Executive Series Utilities (see the utilities documentation for directions). You may also use the following command:

```
C:\> edlin filename
New file
*i
  1:*serverdict begin Ø exitserver
  2:*statusdict begin
  3:*Ø setdefaultpapertray
  4:* ^D
  5:* ^Z
*ex
C:\>
```

The default paper tray change takes effect after the printer is powered off and back on. The lower optional tray is known by the printer as tray Ø. The upper standard tray is tray 1. To change the default back to multi-purpose tray, simply change the Ø in the above program to a 1.

Switching Cassettes (Tray chaining)

You can set your printer to switch to the other cassette automatically when the current cassette is out of paper; this is called chaining. You must have the same size paper in each tray to enable chaining. To specify chaining, send the following command:

```
C:\> edlin filename
New file
*i
  1:*serverdict begin Ø exitserver
  2:*statusdict begin
  3:*true setdefaulttrayswitch
  4:* ^D
  5:* ^Z
*ex
C:\>
```

Tray chaining becomes a default (automatic) function after the printer is powered off and back on. To disable chaining, the command is *false setdefaulttrayswitch*.

NOTE: The PS Executive Series Utilities program may be used to configure the paper trays (if you are using the IBM PC or compatibles).

The PostScript *manualfeed* Operator

To use manual feed for continuous jobs, invoke the PostScript operator *manualfeed*. If you define */manualfeed* to be *true*, the printer enters into the manual feed mode only. In this mode, your printer no longer accepts paper from either the standard or optional trays, but waits for paper to be inserted into the multi-purpose tray. Your printer waits for **60 seconds**; this wait is called the manual feed timeout.

This operator changes to manual feed for these jobs only; it does not change the default. Thus, when you power off/power on, you return to automatic feed. Invoke the operator by entering the following:

statusdict begin /manualfeed true def

NOTE: The printer prints on manually fed paper without manual feed selected through PostScript command. Simply insert a sheet into the multi-purpose tray openings after removing any other paper from the tray. However, after the sheet in the tray prints, the printer returns to automatic feed. This is handy if you want to print a one page file or a file on letterhead. You can do so without setting the printer to manual feed.

PostScript contains an operator, *manualfeedtimeout*, which limits how long the printer waits for a sheet of paper to be inserted. If no paper is inserted within the time allotted by *manualfeedtimeout*, then a **timeout** error occurs and the current job is aborted. If you want to remain in the manual feed mode without time constraints, redefine *manualfeedtimeout* to **0**.

If the 60-second default timeout is in effect, when the current job finishes the printer returns to automatic feed. It remains in automatic feed for all subsequent jobs until another *statusdict begin /manualfeed true def* command is sent to the printer.

Manual Feed Within Your Program

1. After you create the file to print using manual feed, save that file using the print-to-disk, spool-to-disk, or save unformatted for ASCII. How you save your file as an ASCII file varies according to the software program. Check your program documentation. (The PS Executive Series program has a save-to-ASCII function you may use to save your file.)
2. After saving as an ASCII file, exit your application program. Edit the ASCII file using an ASCII text editor. Examples of these editors are DOS's Edlin, WordStar's Non-Document Mode, or Sidekick's Notepad, as well as others. Add the following command to the beginning of the ASCII file:

statusdict begin /manualfeed true def

3. Send the file to the printer using the PS Executive Series program or DOS. If on the DOS level, make sure you understand the manualfeed timeout as it could limit the time of the procedure.
4. Line up and insert a sheet of paper in the standard tray. **The side of the paper to be printed should face up.**
5. If you are printing transparencies, sheets of self-adhesive labels, or envelopes, use the face-up tray.

Changing Default *manualfeed*

You can set your printer to manual feed for an indefinite period of time. However, you have to enter the proper commands to reset the printer to automatic feed. To set printer default to manual feed, send the following commands exactly as they appear here.

The printer defaults to manualfeed immediately. To reset the printer to automatic feed, enter the command **/manualfeed false def** in place of the command shown as line 3.

```
C:\> edlin filename
New file
*i
  1:*serverdict begin Ø exitserver
  2:*statusdict begin
  3:*/manualfeed true def
  4:* ^D
  5:* ^Z
*ex
C:\>
```

WARNING! An error in any of the commands invalidates it. For this reason, you may want to create a standard file for manual feed, testing it to make sure it works.

About Timeouts

The PostScript software in your printer contains operators which limit the time the printer remains in various states of operation. These are the **timeout operators** and there are of interest:

- The **job** timeout
- The **wait** timeout
- The **emulation wait** timeout
- The **autoselectwait** timeout

At the beginning of each job, the printer sets these timeouts to default values. You can send your printer a PostScript command which changes these values. The operators which control the timeout values are described in chapter 10, “PostScript: Operator Dictionary.”

job	Default for this timeout is set to 0 , or indefinite. The job timeout, if non-zero, limits the total time that the printer executes a job. This protects the printer from being tied up by a PostScript program that runs for an unexpectedly long time (or forever).
wait	Default for this timeout is 30 seconds . The wait timeout limits the time the printer waits to receive additional input for a job already in progress. This protects the printer from being tied up indefinitely by a host computer that crashes or is disconnected while sending a file to the printer.

If a job or wait timeout expires, PostScript software executes the **timeout** error causing the current job to terminate. Setting a zero timeout value gives that timeout no time limit (i.e. it never times out). It is generally a good idea to leave the job timeout at its default value of 0, especially when printing long, graphics-intensive, files.

The timeout facility is not ordinarily enabled when the printer is in interactive mode.

Auto Select and Emulation Timeouts

The other two modes of communication, emulation and ESP, also have timeouts associated with them. They are

emulation wait	Default for this timeout is 5 seconds. The emulation wait timeout limits the time the printer waits for more data on a job already in progress. It is only supported for emulations (for example, HP PCL), not PostScript.
autoselect wait	Default for this timeout is an integer value 3 seconds. The autoselect wait timeout limits the time the printer waits before trying to select the proper language. This period is ignored if 256 bytes of data are received before 3 seconds expires. It is only supported when the interface is in ESP mode.

Manual Feed Notes

If manual feed is invoked (by setting **manualfeed** to be *true* in **statusdict**) too quickly after printing a previous page using normal feed (from the paper tray), the printer mechanism ignores the request to use manual feed. To avoid this problem, when switching from normal to manual feed, be sure at least 5 seconds elapse before issuing the next **showpage**. If necessary, insert a delay explicitly by executing the statement

```
usertime 5000 add  
{dup usertime lt {pop exit} if} loop
```


Chapter 10

PostScript: Operator Dictionary

Introduction	10-1
About the statusdict	10-2
Entering the statusdict	10-2
Changing Persistent Parameters	10-3
The serverdict Password	10-3
Operators in the statusdict	10-5
Syntax Key	10-7
Other Operators in the statusdict	10-28
The resettodefualts operator	10-33

Introduction

The printer has an extensive set of **system parameters** that control its behavior. These govern the baud rate, the communication protocol of the serial channels, the printer's margins, the timeouts, and other similar functions.

There are two kinds of system parameters:

- **Volatile** - parameters that remain in effect only through the processing of a single file.
- **Persistent** - parameters that persist even when the printer is turned off.

This chapter documents both kinds of parameters. Before changing a parameter, read all the material relating to it first. This helps you avoid mistakes that might have undesirable effects on the printer's software.

In addition, read chapter 10, "PostScript: Technical Overview" before you read this chapter.

NOTE: Most operations detailed in this chapter can be accomplished quicker and more easily through the PS Executive Series Utilities.

About the statusdict

Most system parameters are accessed through a special dictionary named **statusdict**. The name statusdict is a vestige of an early design. The statusdict is the repository for machine- and configuration-dependent operators and values. These operators and values defined in the statusdict vary from one implementation of PostScript to another. The operators and values described herein may not apply to other PostScript printers.

You must enter this dictionary in order to change system parameters. Although PostScript contains other data structures (known as dictionaries), such as the serverdict, the statusdict is the dictionary this chapter documents.

Additional PostScript information can be found in three books, *The PostScript Language Reference Manual*, *The PostScript Language and Graphic Design* and *The PostScript Language Tutorial and Cookbook*, published by Addison-Wesley.

Entering the statusdict

There are two ways to enter the statusdict:

1. Send a file to the printer with the following command at the top:

statusdict begin

2. Use the interactive mode and the command:

statusdict begin

Either of these procedures gets you into the statusdict. You can then change system parameters by invoking operators by their names and specifying new parameters.

Some system parameters are stored in **statusdict** as ordinary data values (integers, booleans, and strings) that may be read by executing their names. They may be changed using the **def** operator.

Please note the following when issuing commands:

- **integer** in a syntax requires you to enter a number.
- **boolean** is a value indicating true/false.
- **string** is an ASCII string which must be enclosed in parentheses ().

Changing Persistent Parameters

Persistent parameters are the non-volatile, or unchanging, parameters in effect every time you power on. These are things like the printer's communication parameters, page margins, and idle-time font conversion.

The serverdict Password

Making permanent changes is controlled by a password. Some printers are used in a shared environment in which it is undesirable for individual users to change the persistent state. In such cases, only a system administrator should be permitted to make such changes. But in the case of a dedicated printer or a small group of cooperative users, the users should be permitted to make changes freely.

The system administrator password is a PostScript integer. The default value is Ø, but it may be changed to any other value by executing the *setpassword* operator.

When you want to change a persistent parameter, begin the file with this `exitserver` command:

`serverdict begin Ø exitserver`

The **`serverdict`** is another special dictionary containing definitions controlling the printer. The above command works where `Ø` is the system administrator password. If the password is incorrect, `exitserver` executes the error, **`PasswordIncorrect`** (which immediately invokes **`stop`**, bypassing **`errordict`**). If the password is correct **`exitserver`** responds with the message

`%% [exitserver: permanent state may be changed]%%`

as a positive acknowledgment to the **`exitserver`** request.

The PostScript program executed between a successful **`exitserver`** and the next end-of-file is permitted to invoke the **`statusdict`** operators that may change persistent parameters. Additionally, all changes made to the state of the PostScript virtual memory (VM), such as creating new objects and storing values into dictionaries, persist until power-off. The modified virtual memory appears as the initial state of all subsequent jobs.

During execution of this program, the VM is not protected from harmful changes that could cause printer malfunction. (This permits the printer's software itself to be patched, should that become necessary.) Also, VM resources consumed by that program remain in use indefinitely. The only way to reclaim them is to turn the printer off and on.

Operators in the statusdict

Some **statusdict** operators change persistent parameters. To invoke these operators, you must access the statusdict. For many, you must also send the **serverdict begin Ø exitserver** as previously described and also reboot your printer. The operators which require this are in the Operator 2 † column. Also some of the operators require you to turn the printer off and back on before they take effect; these operators are marked with an astrisk (*).

FUNCTION	OPERATOR 1	OPERATOR 2 †
Password	checkpassword	setpassword
Timeouts	defaulttimeouts	setdefaulttimeouts
	jobtimeout	setjobtimeout
	waittimeout	setwaittimeout
	emulationwaittimeout	setemulationwaittimeout
	autoselecttimeout	setautoselecttimeout
	manualfeedtimeout	setmanualfeedtimeout
Current Emulation	emulation	setemulation
Emulation Change	softwareiomode	setsoftwareiomode
Emulation (ports)	defaultemulation	setdefaultemulation
Batch Mode	sccbatch	setsccbatch *
Interactive Mode	sccinteractive	setsccinteractive
Buffer Size	buffersizes	
Font Cache	fontcachesize	setfontcachesize *
	getallfontcachesize	
	getallserialbuffersizes	setallserialbuffersizes *
	getallserialbuffersizes	setallparallelbuffersizes *
	getallappletalkbuffersizes	setallappletalkbuffersizes *
Paper Tray	numberofpapertrays	setdefaultpapertray
	defaultpapertray	
Tray Size	defaultmultipurposetraysize	setdefaultmultipurposetraysize
Tray Switch	defaulttrayswitch	setdefaulttrayswitch
Start-up Page	dostartpage	setdostartpage
Printer Margins	margins	setmargins
Printer Name	printrname	setprintrname
<p>†When you want to change a persistent parameter with these operators, begin the file with this command:</p> <p style="text-align: center;">serverdict begin Ø exitserver</p> <p>* These operators require a power cycle before they take effect.</p>		

In general, most of the following system parameters have one operator for determining current status of the system parameter. The second operator sets the parameter to the specified value or state. Each operator is examined in the following section.

Syntax Key

Varying fonts and placement of words in the syntax examples have distinct meanings. PostScript operators are presented in ***Italic Bold*** to indicate this word is actually typed in from the keyboard. **Regular bold** is used for data values, such as booleans, integers, or strings.

Data values of integers, booleans and strings are either entered by you through the keyboard or they are internally returned by PostScript. You enter the value when its placement in the syntax is shown before the PostScript operator. If it is shown in the syntax after the PostScript operator, you do not enter any value; PostScript returns the value.

checkpassword

Syntax: **integer** *checkpassword* **boolean**

Function	This operator returns true if integer <i>is equal</i> to the current system administrator password; otherwise, it returns <i>false</i> (after delaying for one second).
Default	0
Errors	stackunderflow, typecheck

setpassword

Syntax: **old new** *setpassword*

Function	Sets the system administrator password, controlling the ability to make persistent changes to system parameters or to Virtual Memory. The <i>setpassword</i> command requires two integer operands: the old password and the new password. If <i>old</i> is the correct old password, <i>setpassword</i> changes the password to <i>new</i> and returns true ; otherwise it returns false . If you change the password and later cannot recall it, refer to the “Printer Error” section in chapter 7, “Troubleshooting Printer Problems,” to return to factory defaults.
Default	0
Errors	stackunderflow, typecheck

defaulttimeouts

Syntax: **defaulttimeouts job manualfeed wait**

Function	Returns the default job, manual feed, and wait timeout values.
Default	0 60 30
Errors	stackoverflow

setdefaulttimeouts†

Syntax: **job manualfeed wait setdefaulttimeouts**

Function	Establishes the default values for the three timeouts. At the beginning of each job, these values are used to initialize the job, manual feed, and wait timeouts. (A PostScript program may change a timeout for the remainder of the current job by executing the <i>setjob-timeout</i> operator or changing the <i>manualfeedtimeout</i> or <i>waittimeout</i> value in <i>statusdict</i> .) Each parameter must be a non-negative integer denoting a time interval in seconds; the value 0 indicates that the corresponding timeout should never occur.
Errors	invalidaccess, rangecheck, stackunderflow, typecheck

jobtimeout

Syntax: ***jobtimeout integer***

Function	Returns the number of seconds remaining before the job timeout occurs. A returned value of 0 means the job never times out.
Default	0
Errors	stackoverflow

setjobtimeout†

Syntax: ***integer setjobtimeout***

Function	Sets the timeout for the current job to the value <i>integer</i> , a non-negative integer specifying a time interval in seconds. If the current job continues for <i>integer</i> seconds without either completing or executing setjobtimeout again, the PostScript interpreter executes a timeout error. The value 0 disables the job timeout altogether. At the beginning of a job, the printer initially sets the job timeout to the default job timeout returned by defaulttimeouts. (However, in interactive mode, the initial job timeout is always 0.)
Errors	rangecheck, stackunderflow, typecheck

waittimeout

Syntax: ***waittimeout*** **integer**

Function	The wait timeout currently in effect for the PostScript mode; i.e., the number of seconds the printer waits to receive additional characters from the host computer before it gives up and aborts the current job by executing a timeout. At the beginning of a job, the printer initializes <i>waittimeout</i> to the default wait timeout returned by <i>defaulttimeouts</i> ; but a PostScript program may change it to any non-negative integer value. (However, in interactive mode, the wait timeout is always 0.)
Default	30
Errors	rangecheck, stackunderflow, typecheck

setwaittimeout

Syntax: **integer** ***setwaittimeout***

Function	Sets the wait timeout for the PostScript mode. A PostScript program may change it to any non-negative integer value. (However, in interactive mode, the wait timeout is always 0.)
Default	30
Errors	rangecheck, stackunderflow, typecheck

emulationwaittimeout

Syntax: ***emulationwaittimeout*** **integer**

Function	The wait timeout currently in effect for the emulation mode; i.e., the number of seconds the printer waits to receive additional characters from the host computer before it gives up and abort the current job by executing a timeout.
Default	5
Errors	rangecheck, stackunderflow, typecheck

setemulationwaittimeout

Syntax: **integer** ***setemulationwaittimeout***

Function	Sets the wait timeout for the emulation mode. A PostScript program may change it to any non-negative integer value. (However, in interactive mode, the wait timeout is always 0.)
Default	5
Errors	rangecheck, stackunderflow, typecheck

autoselecttimeout

Syntax: ***autoselecttimeout*** **integer**

Function	The wait timeout currently in effect for the ESP mode; i.e., the number of seconds the printer waits to receive additional characters from the host computer before trying to select a language. This period of time is ignored if the printer receives 256 bytes of data before the default timeout occurs. This is ignored if ESP is not the interface mode.
Default	3
Errors	rangecheck, stackunderflow, typecheck

setautoselecttimeout

Syntax: **integer** ***setautoselecttimeout***

Function	Sets the wait timeout for ESP mode. A PostScript program may change it to any non-negative integer value. It is ignored unless the printer is in ESP mode.
Default	3
Errors	rangecheck, stackunderflow, typecheck

manualfeedtimeout

Syntax: **manualfeedtimeout integer**

Function	<p>The number of seconds the printer waits for a page to be inserted into the manual feed slot. This timeout applies only when the printer is in manual feed mode; i.e., when manualfeed is true.</p> <p>When beginning a job, the printer initializes <i>manualfeedtimeout</i> to the default returned by <i>defaulttimeouts</i>. A PostScript program may change it to any non-negative integer value (by using def, put, or store).</p>
Default	60

setmanualfeedtimeout

Syntax: **integer setmanualfeedtimeout**

Function	<p>Sets the number of seconds the printer waits for a page to be inserted into the manual feed slot. This timeout applies only when the printer is in manual feed mode; i.e., when manualfeed is true. A PostScript program may change it to any non-negative integer value (by using def, put, or store).</p>
Default	60

emulation*Syntax:* **integer1 emulation integer2**

Function	Returns the current emulation for the specified interface.
Errors	rangecheck, stackoverflow, stackunderflow, typecheck

setemulation†*Syntax:* **integer1 integer2 setemulation**

Function	Sets the current emulation for the specified interface port. Remains in effect until reset. This command may be used inside the server loop.
Special Note	This feature works for all interface ports. Selecting an emulation that is unsupported on a specific host may cause undesired results (for example, selecting HP PCL for AppleTalk).
Format	<p>Integer 1 = Ø: serial 1: parallel 2: AppleTalk</p> <p>Integer 2 = Ø: PostScript 5: HP PCL (Series II) 200: ESP 4: HP-GL (optional card) 12: LN03 (optional card)</p>
Errors	invalidaccess, rangecheck, stackunderflow, typecheck

defaultemulation

Syntax: **integer1 defaultemulation integer2**

Function	Returns the default emulation for the specified interface.
-----------------	--

Errors	rangecheck, stackoverflow, stackunderflow, typecheck
---------------	--

setdefaultemulation†

Syntax: **integer1 integer2 setdefaultemulation**

Function	Sets the current emulation for the specified interface port. Remains in effect until reset.
-----------------	---

Special Note	This feature works for all interface ports. Selecting an emulation that is unsupported on a specific host may cause undesired results (for example, selecting HP PCL for AppleTalk).
---------------------	--

Format	Integer 1 = Ø: serial 1: parallel 2: AppleTalk Integer 2 = Ø: PostScript 5: HP PCL (Series II) 200: ESP 4: HP-GL (optional card) 12: LN03 (optional card)
---------------	--

Default	Serial - 200 (ESP) Parallel - 200 (ESP) AppleTalk - Ø (PostScript)
----------------	---

Errors	invalidaccess, rangecheck, stackunderflow, typecheck
---------------	--

softwareiomode*Syntax:* **softwareiomode integer**

Function	Returns the current setting of the software i/o mode.
Default	200 (ESP)
Errors	stackunderflow

setsoftwareiomode†*Syntax:* **integer setsoftwareiomode**

Function	<p>Sets the software interface for communication between the printer and the host computer to the value designated by the <i>setting</i> argument. The settings are</p> <p>0: PostScript mode 4: HP-GL (optional card) 5: HP PCL (Series II) 200: ESP 12: LN03 (optional card)</p> <p>The new setting does not take effect until the end of the current job. (The end of the job is defined by a ^D or a timeout.) Only use this command when the printer is in either ESP or PostScript mode.</p>
Special Note	This feature works for all interface ports. Selecting an emulation that is unsupported on a specific host may cause undesired results (for example, selecting HP PCL for the AppleTalk interface).
Default	Serial - 200 (ESP) Parallel - 200 (ESP) AppleTalk - Ø (PostScript)
Errors	invalidaccess, rangecheck, stackunderflow, typecheck

sccbatch

Syntax: **channel *sccbatch* baud option**

Function	Returns the baud rate, parity, and option integer for the specified channel (25).
Default	25 9600 71
Errors	rangecheck, stackoverflow, stackunderflow, typecheck

setscbatch

Syntax: **channel baud options *setscbatch***

Function	Sets communication parameters as specified by three integers designating channel (25), baud rate, and options (see chapter 8, “Printer/Host Communication”). These determine how serial communication is to be performed on the serial channel. The new baud rate and options do not take effect until the end of the current job, and you must cycle the printer off and on. Setting a channel’s baud rate to zero disables the channel; both serial channels should not be disabled. Example: <i>setscbatch</i> 25 19200 67 This sets the 25-pin channel to 19200 baud with no parity and XON/XOFF flow control.
Errors	invalidaccess, rangecheck, stackunderflow, typecheck

sccinteractive

Syntax: **channel *sccinteractive* baud options**

Function	Returns the baud rate and options for the 25-pin serial <i>channel</i> .
Default value	25 9600 71
Errors	rangecheck, stackoverflow, stackunderflow, typecheck

setsscinteractive†

Syntax: **channel baud options *setsscinteractive***

Function	Sets the 25-pin serial communication channel parameters. Also, you must cycle the printer off and on for the new commands to take effect.
Errors	invalidaccess, rangecheck, stackunderflow, typecheck

buffersizes

Syntax: **buffersizes integer1 integer2 integer3 integer4**

Function	Returns configuration, in bytes, of the frame, fontcache, displaylist and communications buffer sizes.
Default	1028096 bytes - frame buffer 153600 bytes - font cache buffer 65536 bytes - displaylist buffer 24576 bytes - host communications buffer

fontcachesize

Syntax: **fontcachesize integer**

Function	Returns sum of virtual memory currently allocated to the font cache size.
-----------------	---

getallfontcachesizes

Syntax: **getallfontcachesizes integer integer integer integer**

Function	Returns four integers indicating the maximum, minimum, current, and default font cache configuration of virtual memory currently allocated within the total sum of font cache size. These numbers are not reflected when using the operators <i>buffersizes</i> or <i>vmstatus</i> .
-----------------	--

setfontcachesize†

Syntax: **integer** *setfontcachesize*

Function	Permits the user to configure the size of the font cache.
Special Note	The buffer may not be configured to be smaller than the minimum size. The buffer may not be configured so that it causes the serial, parallel and AppleTalk buffer sizes, or virtual memory to be smaller than their minimum sizes. Also, you must cycle the printer off and on for this command to take effect.
WARNING!	<p>The user should use extreme care when configuring memory buffers. All memory is added or removed from Virtual Memory and, therefore, could prevent complex jobs from working.</p> <p>Default size = 153600 bytes Minimum size = 102400 bytes Maximum size = limited to available memory</p>

serialbuffersize

Syntax: **serialbuffersize integer**

Function | Returns size of the serial communications buffer.

setserialbuffersize

Syntax: **integer setserialbuffersize**

Function | Sets the serial host buffer size. This size is forced to the nearest larger 2k boundary. Also, you must cycle the printer off and on for this command to take effect.

Default size = 8192 bytes
Minimum size = 4096 bytes
Maximum size = limited to available memory

parallelbuffersize

Syntax: **parallelbuffersize integer**

Function | Returns size of the parallel communications buffer.

setparallelbuffersize

Syntax: **integer setparallelbuffersize**

Function | Sets the parallel host buffer size. This size is forced to the nearest larger 2k boundary. Also, you must cycle the printer off and on for this command to take effect.

Default size = 8192 bytes
Minimum size = 4096 bytes
Maximum size = limited to available memory

appletalkbuffersize

Syntax: **appletalkbuffersize integer**

Function | Returns size of the AppleTalk communications buffer.

setappletalkbuffersize

Syntax: **integer setappletalkbuffersize**

Function | Sets the AppleTalk host buffer size. This size is forced to the nearest larger 2k boundary. Also, you must cycle the printer off and on for this command to take effect.

Default size = 8192 bytes

Minimum size = 8192 bytes

Maximum size = limited to available memory

numberofpapertrays*Syntax:* **numberofpapertrays integer**

Function	Returns an integer indicating the number (1 or 2) of paper trays currently installed (since last power up cycle).
Default	1
Errors	invalidaccess, rangecheck, stackunderflow, typecheck

defaultpapertray*Syntax:* **defaultpapertray value**

Function	Returns the default paper tray number. The value returned is Ø or 1.
Default	1
Errors	stackoverflow

setdefaultpapertray†*Syntax:* **value** *setdefaultpapertray*

Function	Establishes the default paper tray to determine paper tray feed. The value must be Ø or 1, where Ø indicates that the lower tray is the default and 1 indicates that the upper tray is the default. This function is dependent on whether the single standard tray configuration is in place or if the optional second paper tray is available.
Default	1
Errors	invalidaccess, rangecheck, stackunderflow, typecheck

defaultmultipurposetraysize*Syntax:* *defaultmultipurposetraysize* **name** **boolean**

Function	Returns the user configured paper size for the standard paper tray.
Errors	stackoverflow

setdefaultmultipurposetraysize†

Syntax: **name boolean setdefaultmultipurposetraysize**

Function	<p>Sets the standard paper tray size for the standard paper tray. The boolean, true, results in portrait orientation.</p> <p>name = /letter /legal /a4 /b5 /envelope /executivepage</p>
Default	<p>110 volt units default to /letter 220 volt units default to /a4</p>
Errors	<p>invalidaccess, rangecheck, stackunderflow, typecheck</p>

defaulttrayswitch*Syntax:* **defaulttrayswitch integer****Function**

Returns whether the printer is to switch to the other paper tray on paper out. This variable accepts a legal boolean value, *true* or *false*. When defaulttrayswitch is set to *true*, all subsequent paperout errors are suppressed and paper is fed into the printer from the optional tray as long as the optional tray contains the correct paper type. A paper error occurs when the optional tray contains a paper size different than the current paper size. When trayswitch is set to *false* and a paper out occurs, the feed tray is not switched, even if the remaining tray contains the correct paper. If trayswitch changes in value during a job, the new value effects all future paper out conditions for the duration of the job. When changed outside the server loop, it persists over all jobs until subsequently changed.

Errors

stackoverflow

setdefaulttrayswitch†*Syntax:* **boolean setdefaulttrayswitch****Function**

Establishes the default tray switch (chaining). At power-up this value determines if the optional paper tray can be used as a backup when the standard tray is out.

Errors

invalidaccess rangecheck, stackunderflow, typecheck

Other Operators in the statusdict

There are several additional statusdict operators. They have to do with the operation of the printer and are not intended for execution by user programs, but may be useful for obtaining information.

dostartpage

Syntax: **dostartpage** *boolean*

Function	Returns the boolean that specifies whether a test page is printed at power-on.
Default	true
Errors	stackoverflow

setdostartpage[†]

Syntax: **boolean setdostartpage**

Function	Specifies whether or not the printer is to print a test page upon subsequent power-on.
Errors	invalidaccess, stackunderflow, typecheck

margins*Syntax:* **margins top left**

Function	Returns the two margin adjustment parameters set by setmargins .
Default	0, 0
Errors	stackoverflow

setmargins†*Syntax:* **top left setmargins**

Function	<p>Adjusts the printer's margins by changing the alignment of the imageable area on the page. The <i>top</i> and <i>left</i> operands are integers that specify distances in device space (the unit size is one device pixel or 1/300 inch). A positive <i>top</i> widens the top margin and a negative <i>top</i> narrows it relative to the standard margin width. (The top of the page is the edge that emerges first from the printer.) Similarly, a positive <i>left</i> widens the left margin and a negative <i>left</i> narrows it.</p> <p>setmargins is intended only for use at installation time to correct any physical alignment errors that may exist; it has nothing to do with setting the dimensions of the imageable area. The printer hardware imposes margins that cause the image to be clipped if it is moved too close to the edge of the paper; unfortunately, the hardware-imposed margins are not symmetrical about the center of the paper.</p>
Errors	invalidaccess, rangecheck, stackunderflow, typecheck

pagecount*Syntax:* ***pagecount*** **integer**

Function	Returns the number of pages that have been printed by this printer. (There is no way to reset this value.)
-----------------	--

Errors	stackoverflow
---------------	---------------

printername*Syntax:* **(string)** ***printername*** **substring**

Function	Stores the printer's name into the supplied string (overwriting some initial portion of its value) and returns a string object designating the substring actually used.
-----------------	---

Default	(QMS-PS 410)
----------------	--------------

Errors	invalidaccess, rangecheck, stackunderflow, typecheck
---------------	--

setprintername†*Syntax:* **(string)** *setprintername*

Function	Establishes string to be this printer's name. The string is printed on the test page at power-on time; it also defines the name used to identify this printer on AppleTalk. The string should be 31 or fewer characters long, should consist entirely of printing characters, and should not contain the characters ':' or '@'. A string is a composite object whose value must be enclosed in '(' ')'. If you wish to name your printer Bill, it must be entered through the keyboard as (Bill).
Errors	invalidaccess, rangecheck, stackunderflow, typecheck

jobname*Syntax:* **jobname (string)**

Function	A string that specifies the name of the current job. If a PostScript program defines jobname, status responses generated during the remainder of the current job include a 'job' field that reports the text of this string. The string should not contain the characters ':' or ']', since that would disrupt the syntax of status messages.
Default	Null

jobtimeout

Syntax: **jobtimeout integer**

Function	Returns the number of seconds remaining before the job timeout occurs. A returned value of 0 means the job never times out.
Default	0
Error	0

manualfeed

Syntax: **/manualfeed boolean def**

Function	A boolean that controls whether paper is to be fed manually (<i>true</i>) or from the paper tray (<i>false</i>). To use this command, you must include the '/' and 'def'.
Default	False

revision*Syntax:* **revision integer**

Function	An integer designating the current revision level of the machine-dependent portion of the PostScript interpreter.
Default	Ø

The *resetdefaults* operator

PostScript provides a way to return your printer to all of its default factory settings, except **pagecount** and **defaultpapertray**. You may use this operator as a safeguard in case you really mess things up and want to return all volatile (persistent) and non-volatile parameters to the factory configuration.

resetdefaults*Syntax:* **resetdefaults**

Function	Resets all persistent, volatile and non-volatile parameters to the factory configuration. You must cycle the printer off and on for this command to take effect.
Default	Listed on the test configuration page.



Chapter 11

HP LaserJet series II Emulation

Introduction	11-1
About HP Emulation	11-1
Default Settings	11-3
About PCL Commands	11-4
Escape Sequence Syntax.....	11-4
LaserJet Command Summary	11-6
The RESET Command	11-7
Additional Technical Information	11-13
Font Selection.....	11-13
Paper Size Interactions.....	11-13
^D, ^T, and ^C Commands	11-14
Storage of Information.....	11-14

Introduction

Because your printer is an intelligent general purpose computer, it can emulate the Hewlett-Packard LaserJet series II printer. If you have a software package that does not support PostScript but does work with the HP LaserJet series II, you can use this emulation with your program.

About HP Emulation

This emulation is recommended for use with those programs that are not PostScript compatible. Your printer provides some improvements on the LaserJet series II so you are able to do things you could not do before. Among these additional capabilities are

- Improved output speed
- Greater image alignment
- More efficient use of printer memory

The LaserJet series II emulation supports, with very few exceptions, the entire set of escape sequence commands for both the LaserJet and LaserJet series II printers. This includes

- Positioning commands
- Typeface selection commands
- Bitmap graphics

Unlike the LaserJet series II, your printer does not limit the area covered by bitmaps. Additionally, your printer does not limit the rules, macros, overlays, and downloadable fonts of the LaserJet series II printer.

Default Settings

The following table shows the default settings for the LaserJet emulator:

Command	Default Values
Page Orientation	Portrait
Page Length	Length of installed paper cassette
Top Margin	0.25 inches
Text Length	Page length less 0.50 inches
Left Margin	0.0 inches
Right Margin	Right most printable length
Vertical spacing	6 lines/inch
Horizontal Spacing	12/120-inch
Character Set	Roman-8
Pitch	10 cpi
Size	12-point
Style	Upright
Weight	Medium
Typeface	Courier
Graphics Resolution	75 dots/inch
Underlining	Off
Line Termination	<cr>=CR <lf> and <ff>=FF
End-of-Line	Wrap Off
# of copies	1
Paper Source	Tray #1

Table 11.1 *Default Values*

About PCL Commands

Escape sequences are commands sent to the printer to tell the printer what actions to perform. These commands are based on the Printer Control Language (PCL) used by the HP LaserJet and LaserJet series II. There are two kinds of commands in PCL:

Control Characters	These are commands composed of single characters with ASCII values of 32 or less.
---------------------------	---

Escape Sequences	These are commands with multiple characters that begin with an <esc> character (ASCII 27).
-------------------------	--

Both types of commands are included in this summary.

NOTE: Be careful not to confuse the letter **l** and the numeral **1** in the commands below.

Escape Sequence Syntax The generic version, or syntax, of an escape sequence is

Syntax: <esc><cc>[<gc>][<p1><c1>][...<pn><cn>][data]

<esc>	The <ESC> Character must have a decimal value of 27. You need to find a way to enter the hexadecimal, decimal, or octal value, depending on your system. (To enter the escape code most require you to press the ALT key while typing Ø27 on the numeric keypad.)
--------------------	---

<cc>	The command code can fall between Ø and ~, in the ASCII table. In this case, the command is a two-character command only.
-------------------	---

If the command code falls between ! and / in the ASCII table, the command has *parameters*. These parameters

	must be included in the command as they further define the action requested.
<gc>	The group code is used with commands that require additional parameters. This character can be either numeric or alphabetic, depending on the command.
<p1>	<p>Parameter 1 is a numeric value. Options for this parameter are</p> <p>An optional + or - sign An integer 0 through 9 An optional decimal point Optional digits after decimal point, for a fractional part</p> <p>The default value for p1 is 0.</p>
<c1>	<p>The terminating character defines the previous parameter. If this character is an uppercase letter, it also terminates the escape sequence.</p> <p>If c1 is a lowercase letter, more parameters follow.</p>
<pn> and <cn>	These characters are like p1 and c1 : the pn is the additional parameter sometimes required by the c1 , or terminating character, and cn is another terminating character, acting on the pn parameter.
<data>	Sometimes data is required by the command. In this case, the p1 parameter indicates the number of bytes to be sent.

The brackets, [and], shown in the example are NOT part of the command. These symbols are used here to separate the parts of the commands. Do not use the brackets or the < and > when entering the escape sequence.

The example of a generic escape sequence used is quite long only to show the possible placement of codes. Many escape sequence commands, including the ones you may use most often, are much shorter. For example, the escape sequence command to change from portrait orientation to landscape is as follows (note that there is both a lowercase “l” (first) and a numeral “1” (second) in the command):

<esc><&><l><1><0>

The command to change back to portrait is as follows (note that there is a lowercase “l” in this command, and no numeral “1”) :

<esc><&><l><Ø><0>

Check your system and application program documentation before attempting to send escape sequences to the printer. The procedure may vary from system to system. In addition to those programs that allow you to send HP LaserJet series II Emulation escape sequences, you may also send escape sequences using the BASIC programming language, in which case, you would use the **LPRINT** statement.

LaserJet Command Summary

The following is a summary of the commands used with the LaserJet series II. This summary is provided for those somewhat familiar with the LaserJet or LaserJet series II printer. You may need to check the LaserJet or LaserJet series II documentation for additional information. You should also read the section “Additional Technical Information” which follows the Command Summary.

The RESET Command

You should remember that any command change you make within a control code remains in effect until you change it, that is, the printer “defaults” to your change when it powers up. In order for the printer to default to the settings listed in Table 12.1, you may enter a RESET command. If you enter the RESET command of <esc><E> to the beginning of each new command change, your printer performs the commands for change, but returns to the default settings when it completes the job.

NOTE: The tables displaying escape sequence command are printed in Helvetica font. This font was chosen to best show the difference of the lowercase letter l and the numeral 1. Also the uppercase letter O is rounder than the numeral 0.

Function	Parameter	Escape Sequence	Decimal Value
Page Layout Commands			
Orientation	Portrait	<ESC>&l0O	027 038 108 048 079
	Landscape	<ESC>&l1O	027 038 108 049 079
Page Size	Executive	<ESC>&l1A	027 038 108 049 065
	Letter	<ESC>&l2A	027 038 108 050 065
	Legal	<ESC>&l3A	027 038 108 051 065
	A4	<ESC>&l26A	027 038 108 050 054 065
Page Length	# of Lines	<ESC>&l#P	027 038 108 #...# 080
Top Margin	# of Lines	<ESC>&l#E	027 038 108 #...# 069
Text Length	# of Lines	<ESC>&l#F	027 038 108 #...# 070
Perf Skip Mode	On	<ESC>&l0L	027 038 108 048 076
	Off	<ESC>&l1L	027 038 108 049 076
Left Margin	# of Columns	<ESC>&a#L	027 038 097 #...# 076
Right Margin	# of Columns	<ESC>&a#M	027 038 097 #...# 077
Clear Side Margins		<ESC>9	027 057
Paper Input Control			
Manual Feed		<ESC>&l2H	027 038 108 050 072
Upper Tray		<ESC>&l1H	027 038 108 049 072
Lower Tray		<ESC>&l4H	027 038 108 052 072
Vertical Line Spacing			
Set VMI	# of 1/48 inch increments	<ESC>&l#C	027 038 108 #...# 067
Lines/Inch	1 line/inch	<ESC>&l1D	027 038 108 049 068
	2 lines/inch	<ESC>&l2D	027 038 108 050 068
	3 lines/inch	<ESC>&l3D	027 038 108 051 068
	4 lines/inch	<ESC>&l4D	027 038 108 052 068
	6 lines/inch	<ESC>&l6D	027 038 108 054 068
	8 lines/inch	<ESC>&l8D	027 038 108 056 068
	12 lines/inch	<ESC>&l12D	027 038 108 049 050 068
	16 lines/inch	<ESC>&l16D	027 038 108 049 054 068
	24 lines/inch	<ESC>&l24D	027 038 108 050 052 068
Half-line feed		<ESC>=	027 061

Table 11.2 LaserJet Command Summary

Function	Parameter	Escape Sequence	Decimal Value
Print Position Command			
Set HMI	# of 1/20" increments	<ESC>&k#H	027 038 107 #...# 072
Move to Row	Row #	<ESC>&a#R	027 038 097 #...# 082
Move to Col	Col #	<ESC>&a#C	027 038 097 #...# 067
Horizontal	# of decipoints	<ESC>&aH	027 038 097 #...# 072
Vertical	# of decipoints	<ESC>&aV	027 038 097 #...# 086
Horizontal	# of dots	<ESC>*p#X	027 042 112 #...# 088
Vertical	# of dots	<ESC>*p#Y	027 042 112 #...# 089
Push/Pop	Push	<ESC>&f0S	027 038 102 048 083
Position	Pop	<ESC>&f1S	027 038 102 049 083
Raster Graphics			
Resolution	75 Dots/Inch	<ESC>*t75R	027 042 116 055 053 082
	100 Dots/Inch	<ESC>*t100R	027 042 116 049 048 048 082
	150 Dots/Inch	<ESC>*t150R	027 042 116 049 053 048 082
	300 Dots/Inch	<ESC>*t300R	027 042 116 051 048 048 082
Start Graphics	Left-most Pos.	<ESC>*r0A	027 042 114 048 065
	Current Cursor	<ESC>*r1A	027 042 114 049 065
Transfer	# of Rows	<ESC>*b#W [Data]	027 042 098 #...# 087
End Graphics		<ESC>*rB	027 042 114 066
Advanced Graphics			
Horizontal Rule/Pattern Size	# of Dots	<ESC>*c#A	027 042 099 #...#065
	# of Decipoints	<ESC>*c#H	027 042 099 #...#072
Vertical Rule/Pattern Size	# of Dots	<ESC>*c#B	027 042 099 #...#066
	# of Decipoints	<ESC>*c#V	027 042 099 #...#086
Print Rule/Pattern	Rule	<ESC>*c0P	027 042 099 048 080
	Gray Scale	<ESC>*c2P	027 042 099 050 080
	HP Pattern	<ESC>*c3P	027 042 099 051 080

Table 11.2 *LaserJet Command Summary*

Function	Parameter	Escape Sequence	Decimal Value
Advanced Graphics (con't)			
Gray Scale Pattern ID	2% Gray	<ESC>*c2G	027 042 099 050 071
	10% Gray	<ESC>*c10G	027 042 099 049 048 071
	15% Gray	<ESC>*c15G	027 042 099 049 053 071
	30% Gray	<ESC>*c30G	027 042 099 051 048 071
	45% Gray	<ESC>*c45G	027 042 099 055 048 071
	70% Gray	<ESC>*c70G	027 042 099 055 048 071
	90% Gray	<ESC>*c90G	027 042 099 057 048 071
	100% Gray	<ESC>*c100G	027 042 099 049 048 048 071
HP Pattern ID	1 Horiz. Lines	<ESC>*c1G	027 042 099 049 071
	2 Vert. Lines	<ESC>*c2G	027 042 099 050 071
	3 Diag. Lines	<ESC>*c3G	027 042 099 051 071
	4 Diag. Lines	<ESC>*c4G	027 042 099 052 071
	5 Grid	<ESC>*c5G	027 042 099 053 071
	6 Diag. Grid	<ESC>*c6G	027 042 099 054 071
Macro Commands			
Macro ID	Macro ID #	<ESC>&#Y	027 038 102 #...# 089
Macro Control	Start Macro	<ESC>&f0X	027 038 102 048 088
	Stop Macro	<ESC>&f1X	027 038 102 049 088
	Execute Macro	<ESC>&f2X	027 038 102 050 088
	Call Macro	<ESC>&f3X	027 038 102 051 088
	Enable Overlay	<ESC>&f4X	027 038 102 052 088
	Disable Overlay	<ESC>&f5X	027 038 102 053 088
	Delete Macros	<ESC>&f6X	027 038 102 054 088
	Delete All	<ESC>&f7X	027 038 102 055 088
	Temp Macros		
	Delete Macro ID	<ESC>&f8X	027 038 102 056 088
	Make Temporary	<ESC>&f9X	027 038 102 057 088
	Make Permanent	<ESC>&f10X	027 038 102 049 048 088

Table 11.2 LaserJet Command Summary

Function	Parameter	Escape Sequence	Decimal Value
Font Selection			
Symbol Set	Roman-8	<ESC>(8U	027 040 056 085
	USASCII	<ESC>(0U	027 040 048 085
	Linedraw	<ESC>(10U	027 040 049 085
	Math8	<ESC>(8M	027 040 056 077
Spacing	Proportional	<ESC>(s1P	027 040 115 049 080
	Fixed	<ESC>(s0P	027 040 115 048 080
Pitch	10 CPI	<ESC>(s10H	027 040 115 049 048 072
	*12 CPI	<ESC>(s12H	027 040 115 049 050 072
	16.66 CPI	<ESC>(s16.6H	027 040 115 049 054 - 046 054 072
Point Size	7 Pt.	<ESC>(s7V	027 040 115 055 086
	8 Pt.	<ESC>(s8V	027 040 115 056 086
	8.5 Pt.	<ESC>(s8.5V	027 040 115 055 046 053 086
	10 Pt.	<ESC>(s10V	027 040 115 049 048 086
	12 Pt.	<ESC>(s12V	027 040 115 049 050 086
	14.4 Pt.	<ESC>(s14.4V	027 040 115 049 052 - 046 052 086
Style	Upright	<ESC>(s0S	027 040 115 048 083
	Italic	<ESC>(s1S	027 040 115 049 083
Typeface	Courier	<ESC>(s3T	027 040 115 051 084
	Line Printer	<ESC>(s0T	027 040 115 048 084
	*Helv	<ESC>(s4T	027 040 115 052 084
	*TMS RMN	<ESC>(s5T	027 040 115 053 084
	*Prestige Elite	<ESC>(s8T	027 040 115 056 084
	*Gothic	<ESC>(s6T	027 040 115 054 084
Compressed Print		<ESC>&k2S	027 038 107 050 083
* These fonts are available on the HP ProCollection Card.			

Table 11.2 LaserJet Command Summary

Function	Parameter	Escape Sequence	Decimal Value
Font Management			
Font ID	Font ID #	<ESC>*c#D	027 042 099 #...# 068
Character Code	ASCII Code # (Decimal)	<ESC>*c#E	027 042 099 #...# 069
Font and Character Control	Delete all Fonts	<ESC>*c0F	027 042 099 048 070
	Delete all Temporary	<ESC>*c1F	027 042 099 049 070
	Delete last Font ID Specified	<ESC>*c2F	027 042 099 050 070
	Delete last Font ID & Char. Code	<ESC>*c3F	027 042 099 051 070
	Make Temp Font Copy/Assign	<ESC>*c4F	027 042 099 052 070
		<ESC>*c6F	027 042 099 054 070
Create Font (Font Header)	# of Bytes	<ESC>)s#W [Data]	027 041 115 #...# 087
Download Character	# of Bytes	<ESC>)s#W [Data]	027 040 115 #...# 087
Designate Download Character	Primary Font ID#	<ESC>(#X	027 040 #...# 088
	Secondary Font ID#	<ESC>(#X	027 041 #...# 088
Font Default	Primary Font Values - 0	<ESC>0@	027 040 048 064
	1	<ESC>1@	027 040 049 064
	2	<ESC>2@	027 040 050 064
	3	<ESC>3@	027 040 051 064
	Secondary Font Values - 0	<ESC>)0@	027 041 048 064
	1	<ESC>)1@	027 041 049 064
	2	<ESC>)2@	027 041 050 064
	3	<ESC>)3@	027 041 051 064

Table 11.2 *LaserJet Command Summary*

Additional Technical Information

The remainder of this chapter documents how the emulator differs from the LaserJet series II printer.

Font Selection

The LaserJet series II emulation follows the same algorithm for selecting fonts as described in the LaserJet Technical Reference Manual. The resident Courier, Courier Bold, and Line Print Compressed typefaces are completely compatible to the fonts provided in the HP LaserJet series II printer.

Paper Size Interactions

The LaserJet series II printer has a few commands that interact with the PostScript operator to change the printer's paper (note that the lowercase letter l appears in the commands, and not the numeral 1):

<ESC>&l#H For manual feed of paper

<ESC>&l#P If # is less than the maximum lines for the current paper size, the number of lines per page is set to # (as if the **<ESC>&l#F** had been received).

Your printer provides features which reduce the need for these commands. Since these commands are not supported, the emulation ignores them. Because of this you should be careful to load the proper size cassette before beginning the print job.

Manual feed is available by inserting a page into the manual feed slot on either the upper or lower paper tray. Manual feed supports paper sizes up to 8 and 1/2 inches wide (216 mm) and 14 and 1/2

inches long (356 mm). For more information on manual feed see chapters 9 and 6, “PostScript: Technical Overview” and “Printer Use.”

^D, ^T, and ^C Commands

The bitmap graphics of the LaserJet series II printer require that 8-bit data be transmitted to the printer. Hence, when the printer is in the LaserJet series II printer emulation mode, it configures the communication parameters so that all 256 characters are transmitted uninterpreted to the emulator. Thus, the end-of-file (^D for PostScript jobs), the ^T status request, and the ^C job interrupt command are eliminated by emulation. ^L is a formfeed command in HP PCL.

This means you must send a form feed command at the end of each document.

Storage of Information

Management of stored information for the emulator is similar to PostScript: the emulator runs a series of “jobs” with storage reclamation at the end of each job. Since transparent communication in the emulator makes sending any kind of end-of-file character impossible, the only end-of-file is either a manual reset or wait timeout. The length of the timeout period may be set by the user, and infinite is one of the options.

The LaserJet series II printer allows fonts and macros to be downloaded into the printer for use in printing subsequent pages. On the LaserJet series II printer, there is a hierarchy of “temporary” and “permanent” for both fonts and macros. Temporary ones are deleted by a printer reset (e.g. <ESC>E), and by explicit escape

sequences. Permanent ones are deleted when the printer is powered off and back on (or by other explicit escape sequences). When a font or macro is deleted, its space becomes available for reuse, for example, for subsequently downloaded fonts or macros.

The emulator models the storage management of the LaserJet series II printer. Fonts and/or macros may be designated permanent or temporary and may be deleted via the standard LaserJet series II printer escape sequences. When a typeface or macro is deleted, the storage that it occupies becomes available for new downloaded fonts or macros.

For more information on using the LaserJet series II emulation, see LaserJet series II documentation. Some features are not documented in this chapter.



Cable Pinouts

IBM PC	A-1
IBM PC DTR Cable Pinouts	A-2
LocalTalk Pinouts	A-3
Centronics Parallel.....	A-4
Notes to the Table.	A-6

IBM PC

To connect a stand-alone computer to your printer through the 25-pin serial interface requires a null modem cable. The following tables show the suggested **pinouts** for a null modem using DTR for the IBM PC/XT and IBM PC/AT or compatible computers. The cable has a **25-pin** male connector on the printer end and either a **25-pin** or **9-pin** female connector on the computer end.

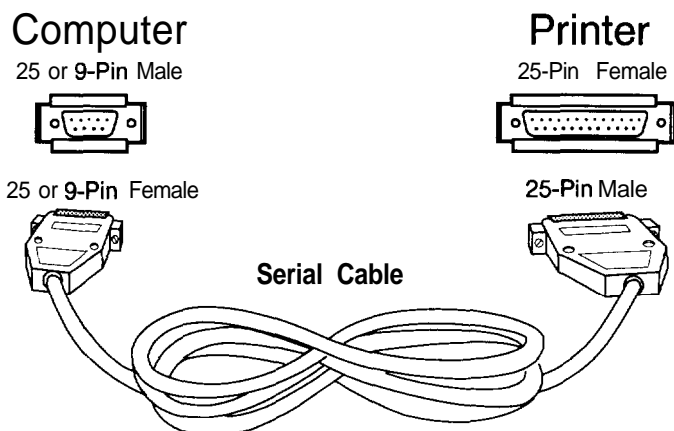


Fig. A.1 *Serial Cable*

Pinouts: *RS-232C*

<i>Pi No.</i>	<i>Name</i>
1	Chassis Ground
2	Transmit Data
3	Receive Data
4	Request To Send (optional)
5	Clear To Send
6	Data Set Ready (optional)
7	Signal Ground
8	Carrier Detect
20	Data Terminal Ready (optional)

IBM PC DTR Cable Pinouts

The following tables show the suggested cable **pinouts** for the IBM PC/XT and IBM PC/AT or compatible computers. We recommend that you use a DTR cable so you can use the default **DTR/DSR** flow control. With a typical RS-232C cable, you can use only **XON/XOFF** flow control.

Pinouts:		
IBM PC/XT	Printer DB-25 S	IBM PC/XT DB-25 P
	1	1
	2	3
	3	2
	4	5
	5	4
	20	T 6+8
	6+8	20
	7	7

LocalTalk Pinouts

The table below gives the pin assignments and functions for the cable used to connect a Macintosh and printer with a DIN-8 cable.

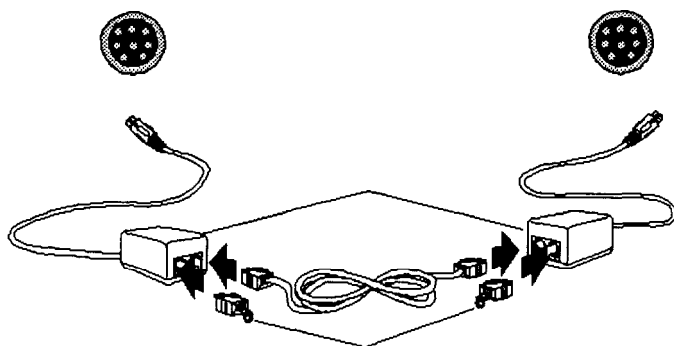


Fig. A.2 PhoneNET Cable for LocalTalk

LocalTalk Pinouts:	Pin No.	Signal Name	Signal Description
	1	HSKo	Handshake out
	2	HSKi	Handshake in
	3	TXD-	Transmit Data -
	4	GND	Signal Ground
	5	RXD-	Receive Data -
	6	TXD +	Transmit Data +
	7	GPI	General Purpose Input
	8	RXD+	Receive data +

Connector type: Mini-8

Centronics Parallel

Shown below is a typical parallel cable.

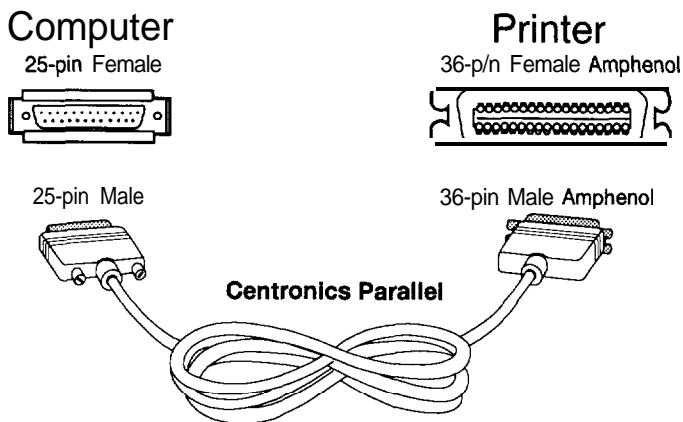


Fig. A.3 Typical Parallel Cable

The table on the next page lists the pin assignments for the Centronics parallel interface cable that can be used with your printer.

Pinouts: Centronics Parallel	Signal Pin No.	Return Pin No.	Signal	Direction
	1	19	STROBE	In
	2	20	DATA 1	In
	3	21	DATA 2	In
	4	22	DATA 3	In
	5	23	DATA 4	In
	6	24	DATA 5	In
	7	25	DATA 6	In
	8	26	DATA 7	In
	9	27	DATA 8	Ill
	10	28	ACKNLG	out
	11	29	BUSY	out
	12	30	PE	Out
	13		SLCTT	Out
	14		NC	
	15		NC	
	16		GND	
	17		CHASSIS GND -	
	18		NC	
	19-30		GND	
	31		NC	
	32		NC	
	33		GND	
	34		NC	
	35		NC	
	36		NC	

Notes to the Table

Direction refers to the direction of signal flow as viewed from the printer.

Return denotes “twisted-pair return” and is to be connected at signal-ground level. When wiring the interface, be sure to use a twisted-pair cable for each signal and never fail to complete connection on the return side. To effectively prevent noise, these cables should be shielded and connected to the chassis of the system unit and printer, respectively.

All interface conditions are based on **TTL** level. Both the rise and fall times of each signal must be less than 0.2 μs .

The cable must be of the type with an overall braided shield, Belden 8345 or equivalent.

Connectors must have shielded housings. The overall shield must be bonded to the shielded housings at both ends of the cable.

Appendix B

Technical Specifications

Print Engine	B-1
Controller.....	B-2
Paper Handling.....	B-3
Interfaces	B-5
Physical Characteristics	B-6
Electrical.....	B-6
Environmental Requirements.....	B-6
Environments	B-7

Print Engine

Print Method	Electrophotographic recording with semiconductor laser. Dry toner, image transfer to plain paper.
Resolution	300 x 300 dots per inch.
Print Speed	4 pages per minute letter or A4 paper size. Actual speed depends on application.
Toner	Dry, single component in user-replaceable cartridge.
Toner Cartridge Life	3,500 pages at normal (5%) page coverage.
Warm-Up Time	About 2 minutes from cold start.
Maximum Duty Cycle	6,000 pages per month.

Controller

Type	68020 MPU-based internal controller operating at 16.6 MHz.
Memory	2.0 MB RAM standard, upgradable to 3, 4, or 6 MB.
Printer Emulations	HP LaserJet Series II (HP PCL) HP-GL 7475A (optional card) LN03 (optional card)
Printer Language	Adobe PostScript page description language.
Fonts	45 resident typefaces which can be scaled from 4 points upward and rotated to any degrees in 1 degree increments. Host-resident downloadable fonts are also available.
Controller Language	Your printer uses PostScript licensed by Adobe Systems, Incorporated.

Paper Handling

Paper Size (Standard Tray)	Letter: 8 1/2" x 11" Legal: 8 1/2" x 14" A4: 210 mm x 297 mm B5: 182 mm x 257 mm Executive: 7 1/4" x 10 1/2"
Special Stocks	Your printer can handle special stocks including envelopes, labels and transparency film. Envelope minimum of 3 1/2" x 7" (86 mm x 178 mm) maximum of 7 2/5" x 10 1/2" (188 mm x 267 mm) Transparency film: Letter, A4 Labels: Letter, A4

Specification	Description
Face Sheet	Must meet specifications in Table B.2
Fusing Compatibility	All adhesives, liners, facestocks and other materials used in the label construction must be compatible with the heat and pressure of the fusing process. Material must not discolor, melt, offset material or release hazardous emissions when heated to 200°C for 0.1 seconds.
Construction	Total construction caliper must not exceed inches (0.18 mm).

Table B.1 *Label Specifications*

Basis Weight	16 to 28 pound (60 to 105 g/m ²)
Grain	Long grain
Moisture Content	4% to 6% weight
Furnish (Composition)	100% chemical wood pulp and/or cotton fiber
Acid Content	5.5 pH minimum
Ash Content	Not to exceed 10% or contain large amounts of clay or talc
Opacity	85% minimum
Brightness	83% minimum
Caliper	3.0 to 7.0 mils
Curl	Inream: flat within 0.3 inch (8mm) Printed: flat within 0.8 inch (20mm)
Cut edge conditions	Cut with sharp blades with no visible fray
Finishing	Cut sheet to ± 0.0313 inch of nominal, $90^\circ \pm 0.2^\circ$
Fusing Compatibility	Must not scorch, melt, offset or release hazardous emissions when heated to 200° C (392°F) for 0.1 second.
Packaging	Moisture-proof ream wrap
Smoothness	100 to 250 Sheffield
Stiffness	1.6 minimum machine direction/0.6 minimum cross direction (Taber)
Surface Strength	12 minimum wax pick (Dennison)
Electrical Surface Resistivity	2.0 to 15 x 10 ¹⁰ ohms/sq (conditioned at 22° C and 50% relative humidity)
Electrical Volume Resistivity	1.2 to 15 x 10 ¹¹ ohms x cm (conditioned at 22° C and 50% relative humidity)

Table B.2 *Paper Specifications*

Paper Tray (standard)	<p>QMS-PS 410 (with standard tray) accommodates:</p> <p>Letter: 8 1/2" x 11"</p> <p>Legal: 8 1/2" x 14"</p> <p>A4: 210 mm x 297 mm</p> <p>B5: 182 mm x 25 mm</p> <p>Executive: 7 1/4" x 10 1/2"</p> <p>Envelope:</p> <p>minimum of 3 1/2" x 7" (86 mm x 178 mm)</p> <p>maximum of 7 2/5" x 10 1/2" (188 mm x 267 mm)</p>
Paper Tray (optional)	<p>Optional paper trays (with cassette feeder) are available for:</p> <p>Letter: 8 1/2" x 11"</p> <p>Legal: 8 1/2" x 14"</p> <p>A4: 210 mm x 297 mm</p> <p>B5: 182 mm x 25 mm</p> <p>Executive: 7 1/4" x 10 1/2"</p> <p>Envelope</p> <p>minimum of 3 1/2" x 7" (86 mm x 178 mm)</p> <p>maximum of 7 2/5" x 10 1/2" (188 mm x 267 mm)</p> <p>See your QMS vendor for details.</p>
Paper Loading	<p>Cut sheet paper from paper tray or manual feed.</p>

Interfaces

Standard RS-232C (null modem with user-selectable serial baud rates up to 19200), Centronics parallel, and LocalTalk.

Physical Characteristics

Type	Compact, dual tray, desktop laser printer with internal controller
Dimensions	350 x 405 x 204 mm Height increases 55 mm when optional tray is added.
Weight	Approximate 11 kg.

Electrical

Power Requirements	110/120v 50/60 Hz or 220/240v 50 Hz.
Frequency	50/60 hz.

Environmental Requirements

Temperature	50 to 90.5 degrees Fahrenheit (0 to 32.5 degrees Celsius).
Humidity	10% to 80% RH.
Noise Level	Less than 55 dB (A).

Environments

Your printer can interface with:

- Apple Macintosh
- IBM PC and compatibles
- Most mini and mainframe computers

Your printer uses industry-standard RS-232 null modem serial, Centronics parallel, or DIN-8 LocalTalk interfaces.

Appendix C

Optional Accessories Available

QMS Accessories C-1

QMS Accessories

The following optional accessories are available from your QMS vendor. Other accessories may have become available since this printing; check with your vendor, or contact QMS through Q-Fax, CompuServe, or the QMS Bulletin Board. See appendix F, “Product Sales and Support,” for information about these services.

- EP-L Cartridge

- Paper Trays:

- Letter Cassette

- Legal Cassette

- Envelope Cassette

- A4 Cassette

- Ram Upgrade:

- 1 MB Ram Upgrade

- 2 MB Ram Upgrade

- 4 MB Ram Upgrade

- Font and Emulation Card:

- ProCollection

- (HP ProCollection compatible)

- HP-GL Emulation Card

- LN03 Emulation Card

■ Documentation:

QMS-PS 410 User's Guide

QMS-PS 410 PS Executive Series User's Guide

QMS-PS 410 Getting Started Guide



Appendix D

Character Encoding Tables

Character Encoding Tables	D-1
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Character Encoding Tables

Character encoding tables are included with this manual as a reference. The standard PostScript fonts use a flexible encoding scheme by which character codes select character descriptions. These tables show the codes of each character. Some programs require you to input character encoding information in order to fully use the available fonts.

At the top of the table is the font name. The numbers at the far left of the tables (`\00x`, `\01x`, `\02x`, etc) are the octal characters. The values across the top of the table are the numbers you would substitute for `x` to access a particular character.

Standard Fonts Character Set

octal	0	1	2	3	4	5	6	7
\00x								
\01x								
\02x								
\03x								
\04x		!	"	#	\$	%	&	'
\05x	()	*	+	,	-	.	/
\06x	0	1	2	3	4	5	6	7
\07x	8	9	:	;	<	=	>	?
\10x	@	A	B	C	D	E	F	G
\11x	H	I	J	K	L	M	N	O
\12x	P	Q	R	S	T	Y	V	W
\13x	X	Y	Z	[\]	^	_
\14x	`	a	b	c	d	e	f	g
\15x	h	i	j	k	l	m	n	o
\16x	p	q	r	s	t	u	v	w
\17x	x	y	z	{		}	~	
\20x								
\21x								
\22x								
\23x								
\24x		ı	ç	£	/	¥	f	§
\25x	α	'	"	«	<	>	—	—
\26x		—	†	‡	•		¶	•
\27x	,	"	"	»	...	&		¿
\30x		`	´	•	•	—	—	—
\31x	..		—	•		"	—	˘
\32x	—							
\33x								
\34x		Æ		ä				
\35x	ı	ø	œ	º				
\36x		æ				i		
\37x	ı	ø	œ	ß				

Symbol Encoding

octal	0	1	2	3	4	5	6	7
\00x								
\01x								
\02x								
\03x								
\04x		!	∇	#	∃	%	&	э
\05x	()	*	+	,	-	.	/
\06x	0	1	2	3	4	5	6	7
\07x	8	9	:	;	<	=	>	?
\10x	≡	A	B	X	Δ	E	Φ	Γ
\11x	H	I	ϑ	K	Λ	M	N	O
\12x	Π	Θ	P	Σ	T	Ψ	ζ	Ω
\13x	Ξ	Ψ	Z	[∴]	⊥	—
\14x	—	α	β	χ	δ	ε	φ	γ
\15x	η	ι	φ	κ	λ	μ	ν	ο
\16x	π	θ	ρ	σ	τ	υ	ω	ω
\17x	ξ	ψ	ζ	{		}	~	
\20x								
\21x								
\22x								
\23x								
\24x		Υ	'	≤	/	∞	f	♣
\25x	♦	♥	♠	↔	←	↑	→	↓
\26x	°	±	"	≥	×	∞	∂	•
\27x	÷	≠	≡	≈	...		—	┘
\30x	ℵ	ℑ	℔	℘	⊗	⊕	∅	∩
\31x	∪	⊃	⊇	⊄	⊂	⊆	∈	∉
\32x	∠	∇	®	©	™	Π	√	.
\33x	¬	∧	∨	↔	⇐	↑↑	⇒	⇓
\34x	∅	<	®	©	™	Σ	(
\35x	(}	(
\36x		>)	
\37x)					})	

ITC Zapf Dingbats Encoding

octal	0	1	2	3	4	5	6	7
\00x								
\01x								
\02x								
\03x								
\04x		✂	✂	✂	✂	✂	✂	✂
\05x	✂	✂	✂	✂	✂	✂	✂	✂
\06x	✂	✂	✂	✂	✂	✂	✂	✂
\07x	✂	✂	✂	✂	✂	✂	✂	✂
\10x	✂	✂	✂	✂	✂	✂	✂	✂
\11x	✂	✂	✂	✂	✂	✂	✂	✂
\12x	✂	✂	✂	✂	✂	✂	✂	✂
\13x	✂	✂	✂	✂	✂	✂	✂	✂
\14x	✂	✂	✂	✂	✂	✂	✂	✂
\15x	✂	✂	✂	✂	✂	✂	✂	✂
\16x	✂	✂	✂	✂	✂	✂	✂	✂
\17x	✂	✂	✂	✂	✂	✂	✂	✂
\20x								
\21x								
\22x								
\23x								
\24x		♫	♫	♫	♫	♫	♫	♫
\25x	♫	♫	♫	♫	♫	♫	♫	♫
\26x	♫	♫	♫	♫	♫	♫	♫	♫
\27x	♫	♫	♫	♫	♫	♫	♫	♫
\30x	♫	♫	♫	♫	♫	♫	♫	♫
\31x	♫	♫	♫	♫	♫	♫	♫	♫
\32x	♫	♫	♫	♫	♫	♫	♫	♫
\33x	♫	♫	♫	♫	♫	♫	♫	♫
\34x	♫	♫	♫	♫	♫	♫	♫	♫
\35x	♫	♫	♫	♫	♫	♫	♫	♫
\36x		♫	♫	♫	♫	♫	♫	♫
\37x	♫	♫	♫	♫	♫	♫	♫	♫

Appendix E

Computer Literacy

How Your Computer Talks to Your Printer	E-1
Your Printer's Memory	E-1
Bibliography.....	E-2

How Your Computer Talks to Your Printer

The following sections introduce you to the method of data transfer between your computer and your printer. This is not essential knowledge to operate and fully use your QMS-PS 410 printer. This information may help you to understand, however, the operation of your printer.

When you enter data into your computer from the keyboard, it performs rapid, complex calculations and compiles and correlates data based on only two numbers, 0s and 1s.

Computers and printers exchange these 0s and 1s as on and off signals. 0 is off and 1 is on. (This is why your printer's power switch has a 1 and a 0.) Each signal is called a *bit*. Eight bits combined form a byte. A byte, with various combinations of 0s and 1s, can represent up to 256 characters, including upper and lower case letters, numerals, punctuation marks, and symbols.

The QMS-PS 410 printer has three interface ports: serial, parallel, and LocalTalk. A serial and LocalTalk cable transmit data one bit at a time. A parallel cable transmits a byte (8 bits) at a time. This is why the parallel interface is usually faster.

Your Printer's Memory

The QMS-PS 410 printer receives data from your computer, stores this data in its memory (called a buffer), and processes it using the rules of the printer's language.

Your printer has three types of memory: a permanent read-only memory (ROM), a long-term memory (EEPROM) and a short-term memory (RAM).

In its permanent memory (ROM), the printer stores all the factory default choices and resident fonts.

In its long-term memory (EEPROM), the printer stores choices not likely to be changed on a daily basis, such as emulation mode. These things stay in memory even when you reset or turn off the printer.

In its short-term memory (RAM), the printer stores the current page data, downloaded fonts, and any other data used to print the current page. Turning off the printer erases everything in short-term memory.

Bibliography

For more information on PostScript programming or printing, refer to the following publications:

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Appendix F

Product Sales and Support

Product Support	F-1
QMS Bulletin Board	F-1
Q-Fax.	F-1
CompuServe	F-2
Third Party Development	F-2
QMS International Service and Support	F-3

Product Support

QMS has an established worldwide network of authorized QMS vendors. Your local vendor (the one from whom you bought the printer) is best equipped to help you. He has specially trained service technicians available to answer any questions. Your dealer also has the latest programs to examine and analyze any problems.

In the continental United States, call or write:

QMS, Inc.
One Magnum Pass
Mobile, Alabama 36618
USA



Telephone (205) 633-4300
Product Information: (800) 631-2692
Product Technical Support: (205) 633-4500
OEM Information: (800) 631-2692
Telex: 266013
Fax: (205) 633-0013
Int'l. Fax: (205) 633-0020

QMS Bulletin Board

You may also communicate with us through the QMS Bulletin Board: (205) 633-3632. Please allow 24 hours (one business day) for a response. The Bulletin Board operates at 1200/2400 baud, 8 data bits, no parity, and 1 stop bit.

Q-Fax

QMS has also established Q-Fax, to allow customers to receive additional product information via fax. The information available for fax transmission includes technical support notes on common

printing problems, and lists of printer specifications, options, consumables, and pricing.

The Q-Fax number is **1-800-633-7213**.

Have your fax number handy when you call (or place the call from your fax machine's handset). You can choose to have either a specific document or a directory (a list of currently available documents) faxed to you. The first time you call, request a directory (press 2 on your phone when prompted) to find out what is currently available. Then call back to request the specific documents. You can order up to 3 documents per call.)

CompuServe

For general questions other than technical support, you may communicate with QMS or share information with other users on CompuServe. When you use CompuServe, simply type **GO DTPVEN** to enter the DTP Vendor forum; QMS is section 3 of that forum. The QMS library section contains such things as printer drivers, utilities, technical information, and announcement files.

Third Party Development

If you would like a list of software applications which support this printer, call Third Party Development, Telephone (205) 633-4300.

Outside the continental United States, call or write the closest center to you.

QMS International Service and Support

Canada

QMS Canada Inc.
9630 Rte Trans-Canadienne
Saint-Laurent, Quebec
Canada H4S 1V9
Telephones: (514) 333-5940
(800) 361-3392
Fax: (514) 333-5949

Calgary Office:
Telephone: (402) 266-3500

Mississauga Office:
Telephone: (416) 673-8060
(800) 387-3188

Ottawa Office:
Telephone: (613) 563-1177

Quebec Office:
Telephone: (418) 522-0508

Vancouver Office:
Telephone: (604) 872-0631
(800) 633-6176

Europe

QMS Europe B.V.
Reactorweg 160
P.O. Box 8540
NL-3503 RM Utrecht
The Netherlands
Telephone: (31)-30/420129
Fax: (31) 30/431201
Telex: 76348

QMS GmbH, Dusseldorf:
Telephone: (49)-211/324200

QMS Ltd., Egham:
Telephone: (44) 784/430900

QMS S.A.R.L., Velizy:
Telephone: (33) 1/40830101

New Zealand QMS New Zealand Limited
P.O. Box 56380
Unit A, 123 Dominion Road
Mt. Eden
Auckland, New Zealand
Telephone: (64)-9/607912
Fax: (64)-9/603599

Australia QMS Australia Pty Ltd.
651 Canterbury Road
Surrey Hills, Victoria 3127
Australia
Telephone: (61)-3/8995777
Fax: (61)-3/8990972



Glossary

ANSI

An acronym for American National Standards Institute. This organization has established many standards in the fields of computing and information processing which are accepted world-wide.

AppleTalk

A network communication protocol most commonly used by Macintosh systems and often used by print networks. See also *LocalTalk*.

ASCII

An acronym for American Standard Code for Information Interchange. Developed by the American National Standards Institute (ANSI), the ASCII standard specifies a seven-bit digital code for each of the ninety-six displayable characters on the standard microcomputer keyboard. ASCII also specifies control characters. The full ASCII character set is 250+.

Baud

The speed at which data is transferred through serial communication.

Baud Rate

Baud rate is the data transfer rate between the computer and the printer. The computer and the printer must be configured at the same baud rate. It can be set between 300 and 19,200 baud depending upon the type of computer used.

Bit

An acronym for binary digit. The bit is the most fundamental unit of information that a computer can accept. It has two states called 1 (one) and 0 (zero), or on and off, and can be used to represent a yes/no type of statement. Groups of bits are used to represent more complex statements such as a character. The most common grouping of bits is called a byte, consisting of eight bits. See also *ASCII*.

Bitmap

A bitmap is a grid composed of small dots used to define an image, line drawing, or character. See *raster graphics*.

Buffer

A storage device used to compensate for a difference in rate or sequence of data flow when transmitting data from one device to another.

Card (Font or Emulation)

Credit-card sized cartridges which contains various fonts and/or emulations not available as resident on the printer. For a complete list, contact your QMS dealer or representative.

Character

A single letter, number, symbol, space, or punctuation mark.

Character Set

A collection of characters.

Command

An instruction that tells the printer to perform a certain function. commands are sent from the host computer to the printer via the interface cable when the printer is online.

Controller

The software that controls the engine of a printer. The controller is the intelligence of the printer.

Concurrent Interfaces

The QMS-PS 410 printer's three interface ports are all active simultaneously. This gives you the ability to print all three ports concurrently rather than be restricted to one. See also *simultaneous interfaces*.

Configuration

Configuration is the process of specifying certain settings to allow your computer and printer to communicate properly. For example, interface selection (serial or parallel) is part of printer configuration. The computer is configured through MODE commands in the AUTOEXEC.BAT file.

Default

A default is a printer control panel setting used in the absence of a software application selection. See also *factory default*.

Document

A document is a file the user makes with an application program. A document can be either text or graphics.

DOS

An acronym for Disk Operating System, which is a program that instructs a disk-based micro-computing system to schedule and supervise work, manage computer resources, and operate and control peripheral devices.

Download

Transfer information from one device to another. Downloaded fonts are not built into the printer. They are transferred from the computer and stored in the printer's memory temporarily. They disappear from the printer's memory when the printer is turned off.

dpi

An acronym for dots per inch, which is a measurement unit used to indicate printer resolution. This printer has a 300 dpi resolution.

DTR/DSR

An acronym for data terminal ready and data signal received, DTR/DSR is a hardware-controlled protocol. It controls the flow of data via signals on the DTR line, as opposed to XON/XOFF protocol, which is software controlled.

Electrophotographic Drum

This is a drum in the *EP-L cartridge* that is sensitive to both light and electricity. It is used in the creation and transfer of images to the printed page. See *EP-L cartridge*.

Emulation

In this manual, emulation refers to the ability of the printer to respond to commands that are intended for a different type of printer. For example, when the printer is set for LaserJet series II emulation, it will respond to the same commands (HP PCL) that a LaserJet series II printer would.

Engine

The part of a printer where the paper is physically processed and printed. It is the body and internal components that house the controller.

EP-L Cartridge

The EP-L (electrophotographic) cartridge contains a photosensitive print drum and a supply of toner. Because the drum is photosensitive, it must be protected from exposure to light. The cartridge, which prints an average of 3,500 pages, is replaceable.

ESP

Emulation Sensing Process is a function by which the controller interprets a file's data stream to determine its printer language and to select the appropriate operating mode. ESP is the default operating mode.

Escape Character

The escape character EC is a special character used to identify a printer command. It is usually not a printable character; instead, it is used as a preface for printer command codes.

Escape Sequence

HP PCL printer commands are also called escape sequences. They begin with an escape character.

Expansion, RAM

See *Memory Upgrade*.

Face-Up Output Tray

A paper tray attached to the printer above the standard tray that results in paper, transparencies or envelopes being stacked in face-up order. This tray is mandatory for transparencies, envelopes and labels.

Factory Default

Factory defaults refer to the printer settings that are programmed into the printer at the factory. These settings are used unless they are overridden with printer commands sent through software or PS Executive Series Utilities. Holding down the **ONLINE** key and the **TEST/CANCEL** key simultaneously until 09 MENU RESET appears returns printing menu items to factory defaults.

Fixed Spacing

Uniform horizontal spacing between characters and symbols in a font composed of characters of uniform width is called fixed spacing. For example, in fixed spacing an i has the same space allotment as a w. Fonts with fixed spacing have a specific number of characters per inch called *pitch*. See *pitch* and *proportional spacing*.

Font

Fonts are collections of characters and symbols. A font is described by its symbol set, spacing, pitch, point size, style, stroke weight, and typeface. Fonts can refer to the printer's internal fonts or to fonts stored in optional font cartridges or on floppy disks.

Font Cartridge

Font cartridges contain fonts which can supplement the printer's internal, resident fonts to increase the variety of available typefaces.

Font Characteristics

Font characteristics determine what a printed font looks like. These characteristics include symbol set, spacing, pitch, point size, style, stroke weight, and typeface.

Fuser Access Doors

The fuser access doors - an internal door and an external door - both allow access to areas where paper may jam.

Fuser Assembly

The fuser assembly contains two heated rollers between which the paper passes after toner has been applied; the heated rollers bond the toner to the paper.

Graphics

Printing, through special software commands, of graphs, diagrams, or other pictorial images.

Handshake, Handshaking

A procedure, usually part of a communications protocol, to establish a data communications path. Devices must be able to communicate with each other. Your printer uses either XON/XOFF or DTR/DSR protocol to communicate with a computer.

HP-GL (Hewlett Packard-Graphics Language)

The HP-GL plotter language emulation is an optional cartridge-based emulation on the QMS-PS 410 printer.

HP PCL (Hewlett Packard Printer Control Language)

HP PCL is the printer control language native to the HP LaserJet series II printer. The QMS-PS 410 printer has an HP PCL emulation.

Icon

A pictorial symbol indicating a printer function.

Interface

The place where two devices are physically connected, allowing them to communicate. On your printer, the interface plate is on the back of the printer towards the bottom.

Interface Cable

A special cable used to connect the printer to the computer so they can communicate.

Interface Port

The QMS-PS 410 printer comes with three interface ports, serial, parallel, and LocalTalk located on the back panel. The cable that attaches the computer to the printer must be plugged into the proper interface port. See *I/O cable*.

Internal Fonts

Internal fonts are permanently stored in the printer's memory. They are also called *resident fonts*.

I/O Cable

The term I/O stands for input/output. An I/O cable attaches the printer to the host computer to allow data or control messages to be input to the printer or output to the computer. See *interface port*.

Landscape Orientation

See *orientation*.

Lower Cassette

The lower cassette is an optional tray you can attach to your printer. It comes with either a letter-size or and A4-size paper tray. Additional paper trays and an envelope tray can be purchased. Optional lower cassettes (LC) provide increased paper capacity as well as adding versatility to your printer by converting it from single to dual bin capability.

LocalTalk

Hardware (cabling, transformer boxes, connectors, ports) for Macintoshes and other systems using the AppleTalk protocol. See *AppleTalk* also.

Media

This refers to any material (paper, envelopes, transparencies, etc.) used in the QMS-PS 410 printer for printed output. See *printing media*.

Memory Upgrade

An available option that is easily attached to the printer's controller board to expand its RAM to a maximum of 6MB. Available in three sizes: 1MB, 2MB and 4MB.

Mode

One of several alternative conditions or methods of operation.

Null Modem Cable

A type of cable used for serial communication. This cable arranges the communication between two devices.

Octal

A number system with the base 8. The octal system uses eight number symbols (0 through 7) and is used as a simple way to represent binary numbers.

Off-Line

When the printer is *off-line*, it will not accept data from the computer. The printer is taken *off-line* by clicking the **ONLINE** key. When the **ONLINE** indicator is off, the printer is *off-line*.

On-Line

When the printer is *on-line*, it will accept data from the computer. The printer is in *on-line* when the **ONLINE** key is clicked and the **ONLINE** indicator is on.

Orientation

Orientation refers to the direction of print on the page. Printing across the width of a page is called portrait orientation printing. The word *portrait* comes from portraits of people which are usually vertical in format. Printing across the length of a page is called landscape orientation printing. The term *landscape* is derived from pictures of the landscape which are usually horizontal in format.

Output Tray Selector

The output tray selector, a lever located on the upper right front side of the paper path door on the printer, is used to adjust the paper path. It series either the *correct order* (face down) or *face-up output tray*.

Page Memory

A special buffer large enough to hold an entire page of data.

Paper Jam

A paper jam describes what happens when paper gets stuck somewhere along the paper path.

Paper Path

This is the path the paper follows in its journey through the printer; it begins at the paper tray pickup point and ends where it exists the printer.

Parallel

A data transmission technique that sends each bit simultaneously over separate lines. It is normally used to send a byte (8 bits) at a time between computers and printers.

Parallel Interface

A parallel interface is a connection between the computer and the printer in which character information is transferred simultaneously over a path through multiple lines. Parallel configuration data transfer is generally faster than serial configuration data transfer. See also *serial interface*.

Parity, Parity Check

The addition of overhead bits to ensure that the total number of 1's in a grouping of bits is either always even (for even parity) or always odd (for odd parity). This permits detection of single errors. It may be applied to characters, transmission blocks, or any convenient bit grouping.

Permanent Soft Fonts

Permanent soft fonts are soft fonts downloaded into the printer's memory that remain resident there, even if the printer is reset, until the printer is powered off or the fonts are deleted by software printer commands. See *downloading*.

Persistent

This term is used to reference printer parameters which remain in the printer's memory after you power off. They appear each time you power on the printer.

Pitch

Pitch refers to the number of characters printer per horizontal inch. For example, 12 pitch means that 12 characters will be printed per horizontal inch. Pitch is only applied to fonts with *fixed spacing*.

Point Size

The height of a character or symbol in a font is measured by point size. There are 72 points per inch. For instance, this text is printed using a 10-point font.

Print Density

Print density refers to the relative darkness of print on the page. Very dense print appears totally black. Less dense print looks lighter, with solid filled areas not totally covered.

Print Engine

The non-intelligent portion of the printer including the laser, print drum, and paper feeding mechanism.

Print Quality

Print quality refers to the sharpness and clarity of the type or graphic on the printed page.

Printer Driver

A printer driver is a file that enables the application program to talk with the printer. Usually, the printer driver is installed within an applications program.

PROM

An acronym for Programmable Read Only Memory. A storage device that can be programmed by electrical pulses. A PROM does not lose its memory when the printer is powered off.

Proportional Spacing

In proportional spacing, horizontal spacing between characters and symbols in a font varies according to the width of the character. For example, an i takes up much less horizontal space than a w in proportional spacing. See *fixed spacing*.

Protocol

A set of procedures that control how data is transmitted between devices.

RAM

An acronym for Random Access Memory, RAM specifies the memory that is transient. Information or data in RAM is lost when the power is turned off or severely interrupted.

Raster Graphics

The system of forming graphics using a bitmap, or grid of small dots, is called raster graphics. The term *raster* denotes the Cartesian grid system in which the dots are arranged. Bitmaps can define images, shapes, or characters created with a specific number of dots per inch. See *bitmap*.

Resolution

A measurement of the dots-per-inch (dpi) in output material, either printed or visual, as in a “high-resolution monitor.” Your printer features a 300-dpi resolution.

ROM

An acronym for Read Only Memory, ROM is a more stable kind of memory than RAM. Information stored in ROM is retained and can be retrieved each time the machine is activated.

RS-232C

A 25-pin hardware interface which allows the transfer of data in an asynchronous serial format. It has five user-defined parameters: baud rate, data bits, parity, stop bits, and protocol.

RS-232C Interface

This serial interface specification is published by the Electronic Industries Association which establishes standards for data communication.

RTS

An acronym for Request to Send. RTS is a signal sent from the host to the printer indicating it is ready to send data.

Serial

A data transmission technique that sends each bit sequentially over a single line. It is normally used to send one bit at a time for data communications.

Serial Interface

This is a connection between computers and printers in which character information is transmitted sequentially as contrasted with parallel or simultaneous transfer.

Simultaneous Interface

The QMS-PS 410 printer's three interface ports are all active concurrently. This gives you the capability to print to all three ports simultaneously rather than be restricted to one. See *concurrent interfaces*.

Soft Font

Soft fonts are fonts created or stored on disks. They can be transferred to the printer's memory and remain available to be used until the printer is turned off. See *downloading*.

Software Application

A software application is any word processing or special application package that can be installed in your computer's memory. WordPerfect, Lotus 1-2-3, and Microsoft Word are examples of software packages.

Spacing

All fonts are designed with either fixed or proportional spacing. In fixed spacing, all characters are the same width. In proportional spacing, character width depends on the character size, and the number of characters per line varies.

Stroke Weight

Stroke weight refers to the thickness of the elements of a character or symbol in a font. Light, medium, bold, black, and condensed are names of different weights.

Style

Style, or character style, refers to whether a character is upright or slanted (oblique or italic). Italics are often used to add emphasis.

Symbol Set

A symbol set is a unique subgrouping of all the available characters in a font. Each symbol set is defined with a specific set of application in mind. For example, the MATH symbol set includes special characters used in mathematical and scientific applications.

Test Configuration Page

The page generated by the print engine when the **TEST/CANCEL** button on the right side of the printer is pressed when the printer is offline. This page shows the current operating parameters of the printer, i.e., interface type, resident fonts, RAM available, printer name, and others.

Timeout

The expiration of a predefined interval which then triggers some action such as a disconnection that occurs following 30 seconds without any data activity (in a 30-second, no-activity timeout). Timeout also refers to the length or existence of such an interval.

Toner

Toner is a dry, powdered substance capable of being attracted to electrically charged areas on a photosensitive revolving drum. The QMS-PS 410 printer's EP-L cartridge holds the toner. The toner is first attracted to this charged area, then attracted to the negatively charged paper. The toner is melted (or fused) in place by the *fuser roller*. **CAUTION:** Toner can stain fabric. Handle it carefully.

Toner Cartridge (EP-L)

A disposable cartridge containing dry toner and a print drum.

Transparency

A type of stationery, also known as OHP (overhead projection) film, commonly used for presentations.

Typeface

Typeface refers to the basic printed design of characters in a font. For instance, Courier, Times Roman, and Garamond Gothic typefaces each print characters of different designs.

Volatile

This term is used to reference printer parameters which remain in the printer's memory only during the current power cycle. They are lost when you power off.

XON/XOFF

Control characters used for flow control in data transmission.

Index

A

Accessories
 Optional 4-1 - 4-19
Adjustments
 Print Density 2-16
Adobe Illustrator 3-3
Aldus PageMaker 3-3
AppleTalk 7-17
 Terminators 7-17
 Transmission E-1
Application Software 1-6
ASAP III 1-4
ASCII File 8-8
Avant Garde Book 5-14

B

Baud rate 2-18, 8-2
 Changing 8-6
Bit E-1
Black Image 7-19
Blank Pages 7-14 - 7-15
Bookman 5-15
Buffer E-1
 Printer E-1
Buffer Sizes 1-2
Buffers 2-18
 Determining Size 10-20
Byte E-1

C

Cable
 Communications 7-15
Cable Pinouts
 Centronics Parallel A-4
 IBM PC/XT A-2
 IBM-PC/XT A-1
 LocalTalk A-3
Cables 7-15
Card
 Removing 4-16

 Emulation 4-16
 Font 4-15
 Installing 4-15 - 4-16
Cards 4-15
 Installing 4-15
Cassette
 Envelope 2-14
 Lower 2-8
 Optional 2-8
Cassettes
 Size Chart 4-10
Centronics Parallel A-4
Channel 8-1
Character Set 5-8
Cleaning Printer 6-10
Cleaning sheet 2-17
Clearing a Paper Jam 7-6
Command summary
 HP LaserJet series II 11-2, 11-6
Communication
 Host 8-1
 Port settings 2-18
 Test 8-1
Communications Buffer
 AppleTalk 10-23
 Determining Size 10-22
 Parallel 10-22
 Serial 10-22
Communcion
 Printer 8-1
CompuServe F-2
Computer Literacy E-1 - E-3
Configuration
 Emulations 3-1
 Interface ports 3-1
 Printer 2-17
 Printer languages 3-1
Controller
 Printer 1-5
 specifications B-2
Copies 1-6
Courier 5-14

D

Dark Image	7-19
Data bits	2-18
Data Transfer Method	E-1
Default Printer Language	3-3
Defaults	
Determining	8-5
HP PCL	11-3
Restore to factory settings	7-5
Restoring	3-12
DEL Character	3-11
Diagnostics	2-17
DIN-8	A-3
Direction	A-6
DisplayWrite	3-3
Distributor	7-21
Documentation	
See Manuals	
DOS Edlin	8-8
Sample Files	8-9
Double-Sided Printing	2-11
Downloading Typefaces	7-14
dpi	1-4
Dreams	3-3
Drivers	3-1
List of	2-1
Printer Software	1-7
DTR	
pinouts	A-2
DTR/DSR	8-5
Dual Tray	
Configuring	4-14

E

Editing Keys	
Interactive Mode	9-5
EEPROM	E-2
Electrical requirements	B-6
Emulation	
HP LaserJet series II	11-1
Emulation Card	4-15 - 4-16
Installing	4-16
Removing	4-16
Emulation Sensing Processor	1-3

Emulation switching

See ESP

Emulations

Automatic Selection	1-3
Exiting	3-7
Identifying Integers	3-6
Parity	3-14
PS Executive Files	3-5
Restoring Default	3-12
Selecting	3-2
End-of-File	3-11
Envelope	
Printing	2-12
Sizes	2-13
Envelope Cassette	2-14
Configuring	2-16
Envelope Printing	2-11
Envelope Sizes	2-3
Envelopes	
Sizes	2-3
EP-L Cartridge	
Breaking In	6-8
Installing	6-5
Removing	6-2
Replacing	6-1
Error Handler	8-13
Error Light Comes On	7-4
ESC Character	3-11
Escape Sequence	3-11
Escape Sequence Syntax	3-11
HP PCL	11-4
Escape sequences	
HP PCL	11-6
ESP1-3, 3-1	
Defined	3-2
Exiting	3-7
HP PCL	3-3 - 3-4
Troubleshooting	3-4, 7-3
Excel	3-3
Exiting HP PCL Emulation	3-11

F

Face-up Output	2-9
Face-up Tray	2-9
Features	
Printer	1-2
Feeder Tray	
Installing	4-3

Feeding Envelopes	2-10
Feeding Paper	
Manual Feed	2-10
Flow control	2-18, 8-1
Software	8-5
Font	
Defined	5-4
Sample File	8-11
Font Cache	
Determining Size	10-20
Font Card	4-15
Installing	4-15
Removing	4-16
Font Cards	4-15
Fonts	
Italic	5-9
Oblique	5-9
Printing	5-1
Resident	5-2
Sans Serif	5-3
Serif	5-2
Storage	1-2
Troubleshooting	5-1
Won't Print	5-1
FreeHand	3-3

G

Garamond	5-15
Guides	
Paper	2-10

H

Harvard Graphics	3-3
Helvetica	5-13
Helvetica Condensed	5-13
Helvetica Narrow	5-14
Horizontal Lines	7-20
HP LaserJet series II emulation	
^D, ^T and ^C commands	11-14
control characters	11-4
default settings	11-3
escape sequence syntax	11-4
Escape Sequence Table	11-7
Font Selection	11-13
information storage	11-14
paper size interaction	11-13

PCL commands	11-4
HP Mode	
Exiting	3-11
HP PCL	
command summary	11-2
End-of-file	3-11
Exiting	3-11
Resident Typefaces	1-6
Setup Strings	1-7
HP PCL Drivers	2-2
HP PCL Emulation	11-1
Escape Sequence Syntax	3-11
HP PCL printing	
Troubleshooting	3-4
HP-GL	3-3
HP-GL Cards	4-15

I

IBM PC	
DTR cable	A-2
pinouts	A-1
Trouble Checklist	7-16
Indicator Lights	
Active	7-3
Paper Jam	7-17
Initialization strings	
See also Setup strings	
Installing	
EP-L Cartridge	6-5
Feeder Tray	4-3
Memory Modules	4-17
Optional Cassette	4-2
Interactive Mode	9-3
Editing Keys	9-5
Entering	9-3
exiting	9-5
Interface	
specifications	B-5
Interfaces	7-15, B-7
Types	1-3
International Support	F-2
ITC Bookman	5-2

L

Label Printing	2-11
Landscape	5-10

Language
 controller B-2
 PostScript 9-1
 Printer 3-2, B-2
 Laser Beam 9-2
 Legal Size Cassette 4-12
 Light Image 7-18
 Lines per inch
 Setting 1-6
 LocalTalk 7-17
 Lotus 1-2-3 1-7, 3-3

M

Macintosh
 Trouble Checklist 7-16
 Macintosh Networks
 Conflicts 7-14
 Manual Feed 2-10
 Envelopes 2-10
 Method 2-10
 Selecting by PostScript 9-8
 timeout 9-8
 manualfeed 10-32
 Manuals
 About 1-1
 Margins
 Setting 1-6
 Memory
 Allocation 2-18
 Printer E-1
 Memory Modules
 Installing 4-17
 Memory Upgrades 4-16
 Microsoft Windows 3-3
 Applications 1-7
 Using with ESP 3-4
 Microsoft Word 1-7, 3-3
 Monospacing 5-7
 Moving Printer 6-9
 Multi-purpose tray
 See Standard tray
 MultiMate 3-3
 MultiMate Advantage II 1-7

N

Name
 Printer 2-17
 New Century Schoolbook 5-15
 Noise level B-6
 Null Modem 7-15

O

Oblique Fonts 5-9
 Operator Dictionary 10-1 - 10-33
 Operators
 statusdict 10-5
 Optional Accessories 4-1 - 4-19, C-1 - C-2
 cards 4-15
 Cassettes 4-1
 Feeder Tray 4-1 - 4-2
 RAM Upgrades 4-16
 Typefaces 4-1
 Optional Cards 4-15
 Options
 Parity and Flow Control 8-2
 Orientation 5-10
 Page 1-6
 Overlay Printing 2-11

P

Page Design 5-1, 5-12
 Pages
 Number of 2-17
 Palatino 5-15
 Paper
 Automatic feed 2-5
 Cassette Selection 4-14
 Clearing Jams 7-6
 Feeding 2-5
 Guides 2-10
 Label 2-12
 Optional Cassette 4-7
 Size 2-18
 Size Chart 4-10
 Sizes 2-3
 specifications B-3
 Storage 2-3
 Tray feed 2-5
 Types 2-2

Weight	2-2	Script	9-2
Paper Cassette		Timeouts	9-11
Installing Optional	4-2	PostScript	10-14
Legal	4-12	PostScript Commands	
Switching by PostScript	9-7	manualfeed	9-8
Types	4-3	setdefaultemulation	3-5
Paper Feeder Tray	4-2	setemulation	3-5
Paper Guide	2-10	setscbatch	8-6
Paper Jams		setsoftwareiomode	3-5
Preventing	7-5	showpage	8-10, 9-12
Paper Sizes		PostScript Operators	
PS Executive	4-14	appletalkbuffersize	10-23
Paper tray		buffersizes	10-20
Configuring	4-14	checkpassword	10-8
Default	2-18	defaultemulation	10-16
Dual	4-14	defaultmultipurposetraysize	10-25
Optional	4-11	defaultpapertray	10-24
Selecting by PostScript	9-6	defaulttimeouts	10-9
Standard tray	2-6	defaulttrayswitch	10-27
Paper Trays	B-5	dostartpage	10-28
Tray Size	10-25	emulation	10-15
Parallel		emulationwaittimeout	10-12
pinouts	A-4	fontcachesize	10-20
Transmission	E-1	getallfontcachesizes	10-20
Parallel Port		jobname	10-31
Changing Language	3-9	jobtimeout	10-10, 10-32
Parameters		manualfeed	10-32
Changing Defaults	8-6	margins	10-29
Default	8-6	numberofpapertrays	10-24
Parity	2-18	pagecount	10-30
Changing	8-6	parallelbuffersize	10-22
Parity and Flow Control Options	8-2	printrname	10-30
Password	2-18, 10-3	resetdefaults	10-33
PC-Write	8-8	revision	10-33
Persistent	10-1	scbatch	10-18
Pitch	5-6	sccinteractive	10-19
Pixels	9-1	serialbuffersize	10-22
Point	5-6	setappletalkbuffersize	10-23
Portrait	5-10	setautoselecttimeout	10-13
PostScript	1-2	setdefaultemulation	10-16
Commands	8-8, 10-5	setdefaultmultipurposetraysize	10-26
Defined	9-1	setdefaultpapertray	10-25
Identifying Integers	3-6	setdefaulttimeouts	10-9
Interactive Mode	9-3	setdefaulttrayswitch	10-27
Operator Dictionary	10-1 - 10-33	setdostartpage	10-28
Operators	10-5	setemulation	10-15
Password	10-3	setemulationwaittimeout	10-12
Prologue	9-2	setfontcachesize	10-21
Sample File	8-12	setjobtimeout	10-10

setmanualfeedtimeout. 10-14
 setmargins. 10-29
 setparallelbuffersize. 10-22
 setpassword. 10-8
 setprintername. 10-31
 setscbatch. 10-18
 setscinteractive. 10-19
 setserialbuffersize. 10-22
 setsoftwareiomode. 10-17
 setwaittimeout. 10-11
 softwareiomode. 10-17
 waittimeout. 10-11
Power Light
 Won't Come On. 7-1
PowerPoint. 3-3
Print Density. 2-16
Print Quality Problems. 7-17 - 7-19
 Black Image. 7-19
 Black Lines. 7-20
 Image Smears. 7-21
 Light Image. 7-18
 Smudge. 7-19
 Vertical Lines. 7-20
 White Lines. 7-18
 White Shapes. 7-20
Print Screen. 7-16
Print Utilities Program. 1-1
Printer
 Controller. 9-1
 electrical requirements. B-6
 Engine. 9-1
 environmental requirements. B-6
 Moving. 6-9
 physical characteristics. B-6
 Resets. 7-14
 Status. 7-2
 Troubleshooting. 7-3
Printer Drivers. 1-6
Printer Error Light. 7-4
Printer Language. 3-2
 Selecting Manually. 3-4
Printer Ports
 Identifying Integers. 3-6
Printing
 Blank Pages. 7-14 - 7-15
 Double-Sided. 2-11
 Envelopes. 2-11
 Fonts. 5-1
 Garbage output. 3-4, 7-3

Label. 2-12
 Labels. 2-11
 Overlay. 2-11
 Sporadic. 7-15
 Transparencies. 2-11 - 2-12
 Trouble Checklist. 7-17
 Unclear. 7-15
Product Support. F-1
Proportional Spacing. 5-7
PS Executive. 1-1, 3-12, 8-1
 Files to Change Emulation. 3-5

Q

Q-Fax. F-1
 QMS Bulletin Board. F-1
 QMS Product Support. F-1
 Quality Problems. 7-17

R

RAM. E-2
 Allocation. 1-2, 2-18
 Expansions. 1-2
 RAM Upgrades. 4-16
Receiving Indicator
 Won't Come On. 7-2
Resident Typefaces. 5-2
Resolution. 1-4
Return. A-6
ROM. E-2
 RS-232C. 8-5

S

Sample Files. 8-9
 Sans Serif. 5-3, 5-5
Serial Cable
 Null Modem. 7-15
Serial communication. 8-1
 Settings. 2-18
 PS Executive. 8-5
Serial Interface. 8-5
Serial Port
 Changing Language. 3-10
Serial Transmission. E-1
 Serif. 5-2, 5-4
 Service Calls. 7-21

- setdefaultemulation
 - Using..... 3-7
- setemulation
 - Using..... 3-7
- setscbatch 8-6
- Setup Strings 1-6 - 1-7
- showpage 8-10
- SideKick..... 8-8
- Smears 7-21
- Smudge..... 7-19
- Software
 - See Application
 - Drivers 3-1
 - ESP..... 3-3
 - Flow Control..... 8-5
 - Macintosh..... 7-14
 - Printer Drivers 1-6
 - Setup Strings..... 1-6
- Software Applications F-2
- Software Drivers
 - List of 2-1
- Software Packages
 - Tested..... 3-3
- Spacing
 - Fonts..... 5-7
- Specifications
 - controller..... B-2
 - interface B-5
 - paper..... B-3
 - print engine..... B-1
- Standard Tray 2-6
 - Loading paper..... 2-7
- Start-up page 2-18
 - Won't Print..... 7-4
- Status
 - printer 2-17
- Status page 2-17
- statusdict..... 10-2
 - Operators 10-5
- Stop bits 2-18, 8-2
- Stroke Weight..... 5-9
- Style 8-2
- SuperPaint 3-3
- Support
 - CompuServe..... F-2
- Symbol..... 5-16
- Symphony 1-7
- System Parameter
 - Non-Volatile..... 10-3

- System Parameters
 - Volatile 10-1

T

- Temperature requirements B-6
- Test Configuration Page
 - Producing 2-17
 - Won't Print..... 7-2
- Third Party Development F-2
- Timeout..... 9-11
 - auto select wait 9-12
 - emulation wait..... 9-12
 - job..... 9-11
 - jobtimeout..... 10-10, 10-32
 - Manual Feed..... 9-8
 - setemulationwaittimeout..... 10-12
 - wait..... 9-11
 - waittimeout..... 10-11
- Timeouts..... 2-18, 3-4, 9-11
 - Emulation wait 3-4
- Times Roman 5-14
- Toner Cartridge..... 6-1
- Transparencies 2-12
- Transparency Printing 2-11
- Tray
 - Optional..... 2-8
- Tray chaining 2-18
- Tray Selection..... 2-7
- Troubleshooting 3-4
- Typeface
 - Card..... 4-15
 - Family..... 5-8
 - Terms 5-4
- Typefaces
 - Resident 1-4 - 1-5, 5-2

V

- Ventura Publisher..... 1-7, 3-3
- Vertical Lines 7-20
- Virtual Memory (VM) 10-4
- Volatile..... 10-1

W

- White Lines..... 7-18
- Windows applications..... 1-7

WingZ 3-3
WordPerfect 1-7, 3-3
WordStar 3-3

X

XON/XOFF 8-5

Z

Zapf Chancery 5-16
Zapf Dingbats 5-16

